



Okken

*for
and*

high dependability switchboard
power distribution up to 6300A
motor control



Merlin Gerin

Modicon

Square D

Telemecanique

Schneider
 **Electric**

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Applications



Okken is a low voltage switchboard with modular structure for electrical distribution and motor control applications in large sites of industrial, tertiary and infrastructures.

Its characteristics guarantee a high level of dependability, a perfect adaptation to the needs of the application and a high degree of upgradeability.

Its ergonomic design simplifies switchboard installation on site, as well as operation and maintenance.

Innovating, patented solutions provide an answer to the demanding deadline and continuity of supply requirements : delayed differentiation and live reconfiguration*.

An homogeneous system of frameworks and busbars means that equipment with front or rear connection can be produced in optimum accessibility conditions.

The various feeder types chosen according to service rating (IS) required by the applications can be combined in the same column or in the same switchboard. Likewise, distribution feeders and motor control feeders can be combined.

A switchboard with an international vocation, Okken is designed to satisfy most local habits.



Reference standards

Okken complies with international standards concerning Type Tested Assemblies (TTA), in particular :

- **IEC 60439-1**, concerning construction of LV assemblies
- **IEC 60529**, defining the degrees of protection of enclosures and the equivalent national standards.

The announced performances have undergone natural size type tests.

* *Live work must be carried out by authorised personnel.*

Data

general data	
applications	distribution motor control
IS (service rating)	211 to 333
reference standards IEC 60529	IEC 60439-1
climatic resistance	damp heat withstand as per IEC 60068-2-30 dry heat withstand as per IEC 60068-2-2 low temperature resistance as per IEC 60068-2-1 salt spray resistance as per IEC 60068-2-11
installation	indoor
environment (EMC)	type 2

mechanical data	
cable entry	top/bottom
access	front/rear
IP	31/42 IP54: consult us
IK	10
form	2b/3b/4a/4b
withdrawability	FFF/WFD/WFW/WWW
dimensions	
height	2200/2350
width	650/900/1000/1100/1150/1300
depth	600/1000/1200/1400
average weight per section	650 kg
coating	epoxy/polyester powder (SP03) polymerised > 50 µ
framework colour	RAL 7016
panelling colour	RAL 1000

electrical data	
rated insulation voltage (Ui)	1000 V
rated operational voltage (Ue)	690 V AC
rated frequency (F)	50/60 Hz
rated impulse voltage (Uimp)	12 kV
rated auxiliary circuit voltage	230 V AC max.
overvoltage category	IV
pollution degree	3
rated current (In)	6300 A
horizontal busbar rating	6300 A
vertical busbar rating	4000, 2100 et 1500 A
rated short-time current (Icw)	
1s horizontal busbar (rated peak current Ipk)	50/80/100/150 kA rms (110/176/2200/330 kA)
rated short-time current (Icw)	
1s vertical busbar (rated peak current Ipk)	50/80/100 kA rms (110/176/220 kA)
rated conditional short-circuit current (Isc)	up to 150 kA
protection of persons against internal arcs IEC 61641	100 kA rms 0.3 s
earthing system	TT-IT-TNS-TNC
power incomer and feeder limits	up to 6300 A
motor control feeder limits	up to 250 kW 400 V

Adaptability



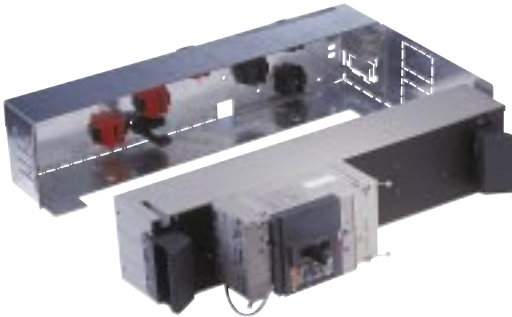
- Equipment is chosen according to operating, maintenance, upgrading, layout and budget requirements which can be contradictory. The wide range of solutions offered by Okken in terms of dimensions, connection type, installation mode, service rating, combination possibilities, delayed differentiation, equipping reserve space at a later stage, including for fixed feeders, enables it to meet project requirements and needs as closely as possible.
- Management of modifications during the project is simplified by interchangeability of FUs and the fact that they can be cabled outside the switchboard.
- **Upgrades made exactly when required, without having to anticipate reserve space equipment, limit investments to what is strictly necessary while at the same time keeping intact the capacity to adapt and change the installation.**

Ease of installation



- **One of the key moments in the success of a project is that of installation and connection on site. Breaking times are normally short, mistakes unforgivable and working conditions uncomfortable.**
- Okken provides new answers that simplify and ensure the reliability of this phase.
 - built-in handling plinth, allowing movement by pallet truck or lifting device
 - removable cross-pieces and cross-members allowing access to connection compartments (patented system) for carrying out of cable-end lugs outside the switchboard.
 - wide choice of front or rear connection compartments
 - pre-mounted sliding fishplates, easily accessible thanks to the removable cross-members
 - standardised connection for busbar trunking including phase inversion and dimensional compensation devices.

Ease of maintenance



■ Operations of maintenance, as well as upgrading, are easier, faster and safer, thanks to the Polyfast system (patented system). Withdrawal of a moving part, replacement or addition of a fixed part, and even total reconfiguration are possible **without switching off the section***. **These advantages, previously reserved to withdrawable technologies, are now applicable to plug-in and disconnectable functional units.**

■ As their connection to the busbar are made by means of clamps, the same advantages apply to fixed and plug-in on base units. In this case load interruption is necessary but limited to the mounting plate fitting.

■ **The use of a double-clamp connection system simplifies the work of maintenance of the switchboard on a critical element : the distribution busbar. The constraints it suffers are reduced, the clamps can be easily inspected or changed.**

Safety



■ OKKEN is a Large Site switchboard. Considerable stress is exerted on these switchboards during operation by a hostile environment, rapid intervention and modification needs. In view of the demanding requirements for continuity of supply, interventions are frequently performed in urgent, stressful conditions.

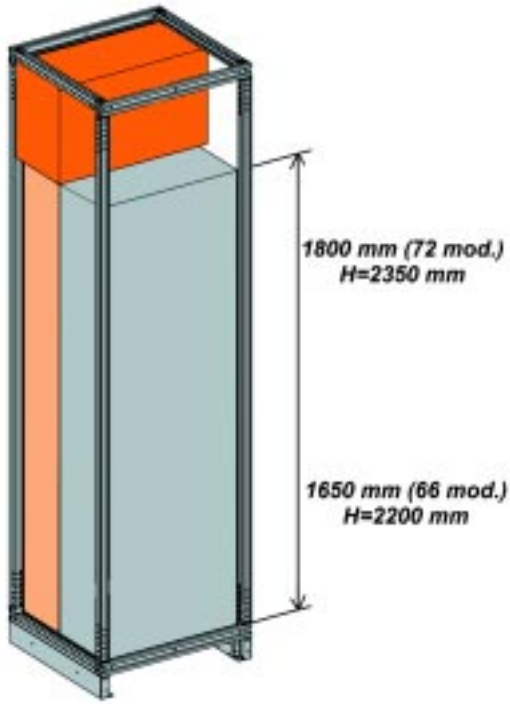
■ **Safety of operators and installations is thus a decisive criterion in Okken's design.**

■ In addition to a wide choice of partitioning forms, Okken is characterised by :

- red insulators for clamps in contact with the busbar
- a red IP XXB busbar protection grid
- self-compensated double clamps for the FU/busbar connection
- a draw-out safety device on plug-in and disconnectable FUs (>80A)
- disabled drawer operation when the device is closed (for drawers equipped with Compact circuit-breakers or fuse-switches).
- mechanical indexing and front panel indication of drawer positions.
- ergonomic grippers for plug-in and disconnectable FUs
- intuitive layout of drawer operating, control and signalling devices
- design allowing, in addition to lifting using slings, positioning of each column by pallet truck
- standardised and tested connections with busbar trunking.

* Live work must be carried out by authorised personnel.

Distribution of zones in a cubicle



The cubicle houses the power devices and the busbars and is divided into 4 fully partitioned zones. The auxiliaries and connections are placed in specific compartments located at the rear or on the side of the cubicle. This design protects auxiliaries from undesirable effects (temperature rise, electromagnetic radiation) generated by the power circuits. Okken's minimum form is 2b. Moreover, the degree of protection IP2X is guaranteed when the switchgear zone doors are open and the functional units are in the "test, draw-out or withdrawn" position.

■ main busbar : a single size

Placed at the top of the switchboard, the main busbar is installed in a volume whose height does not vary whatever the connection and incoming configuration, and with a depth of 600 mm up to 4000 A.

■ switchgear

The zone intended for switchgear is defined vertically in 25 mm high modules. Installation of the FU includes the volume required for proper operation, for the safety perimeter, for connections and for protection against direct contact.

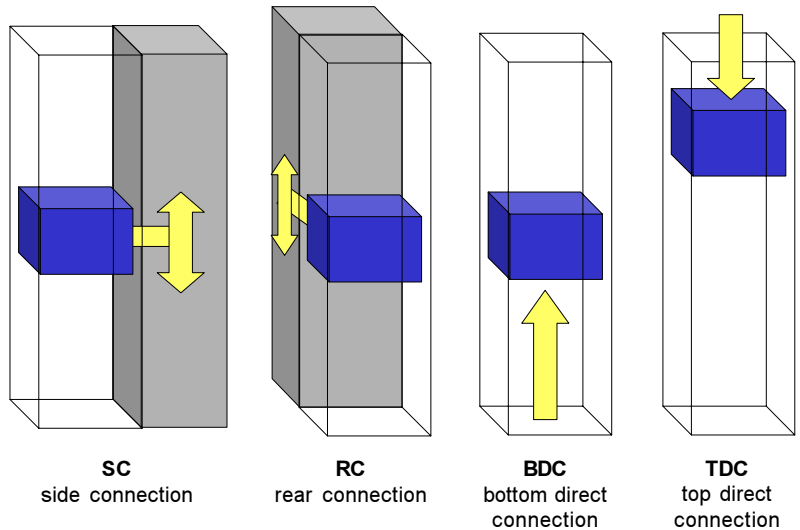
■ distribution busbar : always at the rear of the power devices

The vertical busbar leaves the zone intended for switchgear and its connections completely free.

■ the plinth: for column handling and switchboard ventilation

The plinth is used to fix the switchboard to the ground and includes a handling space for pallet truck or fork-lift truck. Anti-intrusion grids allow cool air to enter the column. Natural convection maintains a normal operating temperature.

Connection types



■ Connections can be made traditionally from the front or rear, from the top and/or the bottom. The layout and position of busbars allows considerable space for cable entry from the top, including in front connection, without penalising heat loss characteristics or fishplate access. In front connection, the connection compartment is located to the right of the switchgear cubicle.

■ Furthermore, Okken allows direct connection configurations on a power device in a 600 mm deep cubicle, from the top or from the bottom. This option is particularly advantageous for reducing switchboard ground surface area without compromising connection ease.

■ Connection to the power circuit-breakers is possible by cables or by busbar trunking system.

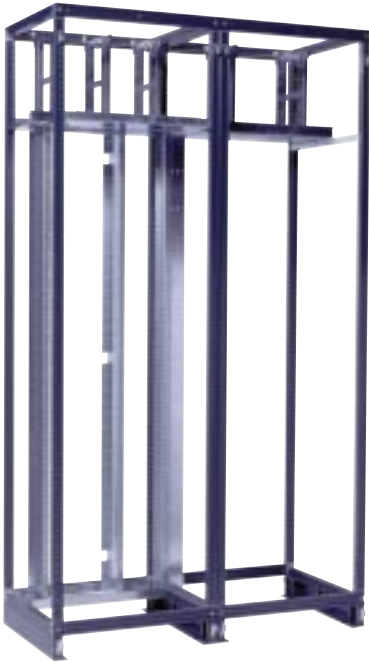
Should busbar trunking be used, the transformer/busbar trunking/switchboard assembly is tested (Type Tested Assembly).

This assembly includes standardised connection interfaces, a phase inversion device and a compensation element for dimensional compensation.

■ The power cables are clamped on cable tie-bars and rails.

■ The auxiliary cables are fastened on a metal trunking.

Frameworks



The framework of an Okken cubicle consists of vertical frames and horizontal cross-pieces supported by a transport plinth, forming a shock-resistant and rigid assembly that cannot be deformed. The cross-pieces and cross-members can be disassembled from the outside **while preserving overall rigidity** to allow carrying out of cable-end lugs outside the switchboard and simplify fishplating (patented system). A variety of width and depth combinations allow assembly of switchgear cubicles and auxiliary or connection compartments. **The switchgear cubicles have a single size up to 4000 A.**

Cover panels



The framework receives various types of panels for equipment protection :

■ Front panel:

- Plain door
- Transparent door
- Dedicated partial door
 - for Masterpact
 - for Compact

- Drawer front panel
- Reserve space front plate
- IP 31 ventilation grid
- IP 42 cover plates

■ Rear panel:

- Screwed-on rear panels, if the switchboard is connected from the front
- Doors if the switchboard is connected from the rear

■ Side panels:

- Screwed-on plain panels, in 2 superposed parts.

■ Top part

- Roof

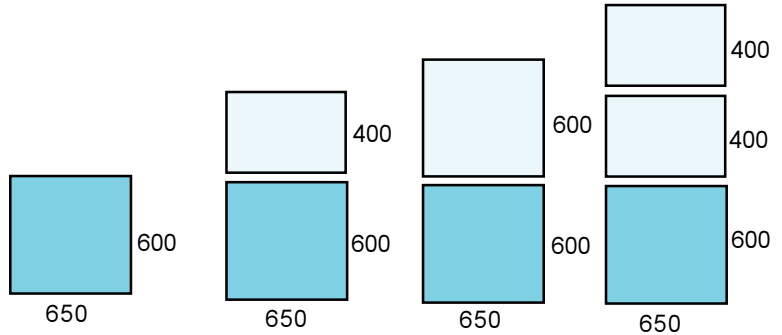
■ Bottom part

- Gland plates

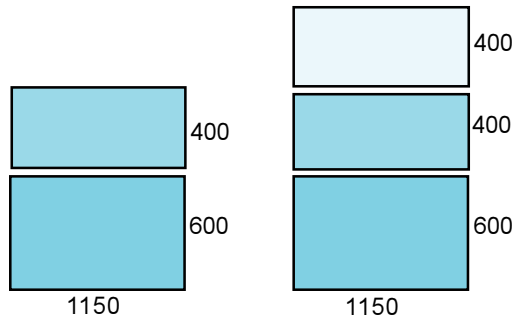
Inter-column and front-rear separations (for 250 mm wide auxiliary compartments) complete the partitioning of each column.

Associations

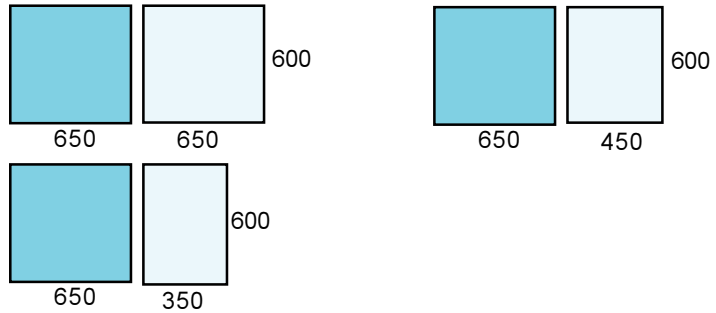
■ The basic switchgear cubicle is always 650 x 600 mm, for all switchgear up to Masterpact NW40. A variety of depths are feasible for rear connections according to the configuration.



Note : for NW40b to NW63, the basic cubicle is 1150 x 1000 mm.



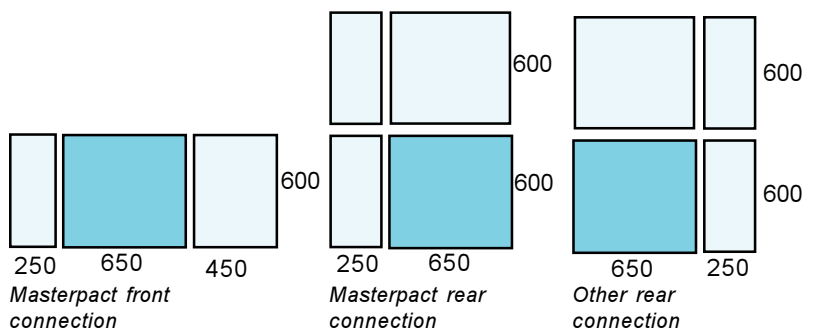
■ Likewise for front connection, compartments from 350 to 650 mm offer an excellent cabling comfort whatever the cross-section of the cables to be connected.



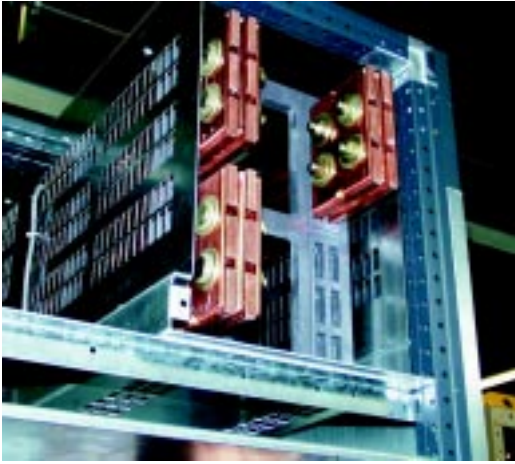
- A 250 mm wide compartment is dedicated to implementation of auxiliaries. It is installed:
 - to the left of a switchgear cubicle equipped with Masterpact in front or rear connection
 - to the right of a switchgear cubicle in the other configurations with rear connection

In front connection apart from Masterpact, auxiliaries are installed in the connection compartment.

According to the switchgear to be installed, wider compartments, up to 650 mm, can be used.



Main busbar

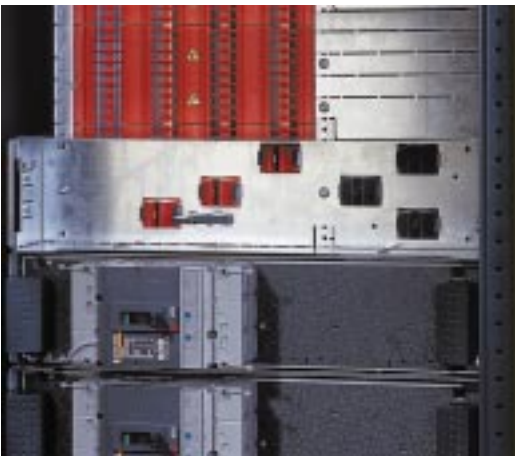


Placed horizontally in a partitioned compartment at the top of the switchboard, it consists of copper bars with a single cross-section (40 x 10), whose number varies according to rated current, ambient temperature and degree of protection of the enclosure. The connections to the distribution busbars and fishplates are made without drilling, thus simplifying site extensions. The original square type layout of the bars offers 3 advantages :

- the best layout in terms of limitation of electromagnetic radiation
- it frees the surface necessary for cable penetration from the top in front connection, while at the same time preserving a favourable thermal exchange at busbar level
- It increases electrodynamic withstand of the busbar.

Note: Beyond 4000 A, the busbar is double and requires a minimum depth of 1000 mm.

Distribution busbars



Installed in a partitioned compartment to the rear of the switchgear zone, it consists of 10 mm thick bars whose cross-section and/or number depend on the current to be distributed in the cubicle. Functional units up to 630 A are connected without drilling by means of clamp connections. Access to the busbar is protected at the front by IP2X insulating grids. Power circuit-breaker connections are screwed on. The slots for the Masterpact NW are standardised and bars are punched in the workshop, thus allowing addition on the site.

Protection conductor

The protective conductor ensures equipotential bonding of frames. It is made up in each cubicle of a horizontal conductor connecting column frames to one another and of a vertical conductor accommodating the power cables protective conductors and the earthing connections when devices so require.

Cross-section :

40 x 5	for $l_{cw} \leq$ or = 50 kA
40 x 10	for $50 \text{ kA} < l_{cw} \leq 100 \text{ kA}$
80 x 10	for $l_{cw} > 100 \text{ kA}$

Auxiliary busducts



Auxiliary busducts ensure distribution of auxiliary supplies and reference voltages of monitoring circuits, as well as of some communication buses. They are installed in the connection compartments throughout the useful height of the cubicle.

General

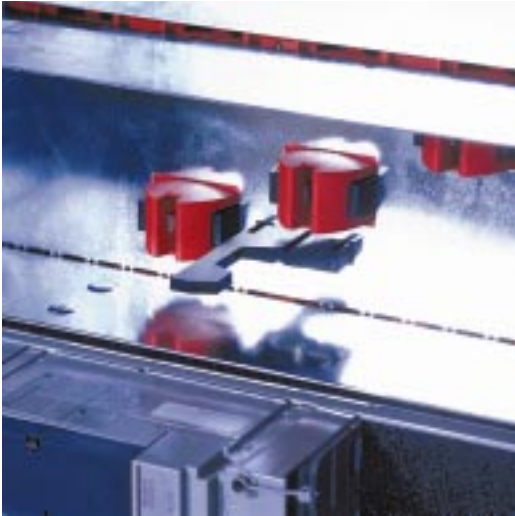


The range of Okken functional units covers all needs, whether they are expressed in terms of installation mode, withdrawability, form or Service Rating (IS).

Dimensions are standardised for each type of device installed and expressed in 25 mm high modules. FUs normally take up all the useful width of the cubicle. For drawers, a half-width version for ≤ 37 kW powers increases installation capacity in the switchboard.

Switchgear up to 630 A is installed on mounting plates or interfaces, the whole forming complete independent and interchangeable functional units.

These functional units give priority to delayed customisation, in the plant and on site, as each one can be prepared outside the switchboard.



Clamps

Up to 630 A, all functional units are connected to the distribution busbar by a double-clamp connection, allowing interchangeability and quick additions, while also preventing wear and damage to the busbar during plug-in/plug-out operations. These clamps (patented system) are **self-compensated without limit value** so that clamping force increases with short-circuit current.

There is thus no risk of repulsion of a drawer or FU whatever the short-circuit current.

For feeders on mounting plate, mountable and removable with power off, clamps are fastened to the support assembly.

For other FU types, they are accessible when the functional unit is withdrawn and can be installed or removed with power on*, without risk, thanks to the IP2X protection of the busbars and clamps. In order to immediately identify the parts in contact with live parts, the insulator of the clamps connected to the busbar is red.

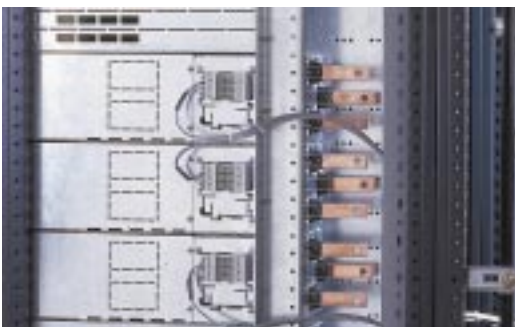
As clamps form a vital component for functional features, performance and reliability of the switchboard, they benefit from individual manufacturing inspections and total traceability.



Polyfast

Polyfast interfaces (patented system) are dedicated to Compact NS100 to NS630 and GV7 circuit-breakers. They are made of an insulating moulded material. Acting as a base for disconnectable, plug-in, withdrawable in drawer units, they ensure **dependability** of a device/ installation system assembly, **standardised and tested**. The built-in, insulated power connections provide effective protection against internal arcing risks. Plug-in and plug-out on load is impossible in all configurations thanks to the safety mechanism tripping the device. Auxiliary wiring is made secure in a dedicated zone and connected to the sliding contact connectors attached to the interface : switchboard legibility is facilitated, maintenance simplified and interference between power circuits and auxiliaries reduced.

Polyfast also ensures prompt intervention, interchangeability, easy addition with power on* and flexibility.



Withdrawable auxiliary blocks

These blocks with 6 sliding contacts accommodate the cabling of the auxiliary circuits and perform the "test" function of the drawers : power disconnected, auxiliaries connected.

The moving part is protected mechanically when the FU is removed. The fixed part is installed on the right-hand side plate of the fixed part of the FU and houses the "customer" cables in front connection. Cabling between the fixed part and the output terminal block is only necessary in rear connection.

Equipment capacity :

Drawers as from 6 modules	: 4 blocks (24 contacts)
3-module drawers	: 2 blocks (12 contacts)
Plug-in Polyfast	: 2 blocks (12 contacts)
Disconnectable Polyfast	: 2 blocks (12 contacts)

* Live work must be carried out by authorised personnel.

Withdrawable on chassis FU



This solution simplifies maintenance of high power devices (Masterpact and Compact NS 630b to NS1600). The devices are installed on a chassis allowing the “plug-in / test / draw-out / withdrawn” positions with acknowledgement by mechanical action from the front when changing from one position to another. In all positions, the IP 2X degree of protection is maintained. Form 4b is recommended on all incoming units (form 3b minimum by design).

Plug-in Polyfast FU



This solution offers, for distribution, the highest possible level of flexibility and safety :

- free addition and reconfiguration,
- easy modification of rating,
- non-propagation of arc inside the FU,
- draw-out safety,
- identification of risk zones,
- cabling of power and auxiliaries circuits outside the switchboard,
- easy gripping.

The functional unit is made up of a fixed part, installable and removable with power on*, equipped with upstream and downstream plug-in clamps and with a moving interface, Polyfast, supporting the circuit-breaker, of the fixed type. Ergonomic handles simplify gripping of the moving part. The downstream connections are made in the fixed part on connection bars in the side or rear compartment, and the auxiliaries on sliding withdrawable auxiliary blocks. The operating mechanisms are accessible behind the door.

Disconnectable Polyfast FU



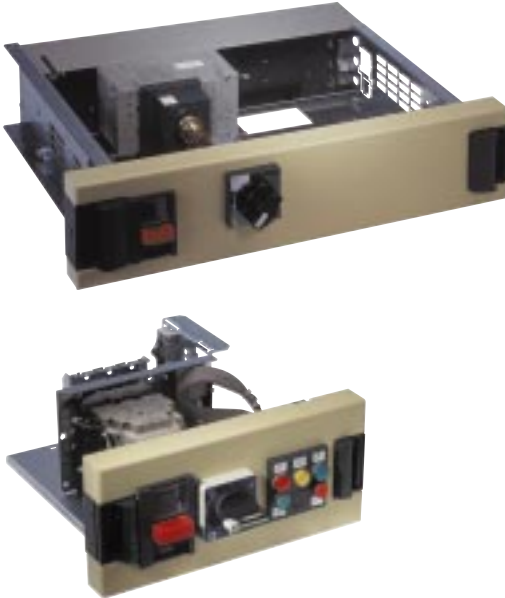
Disconnectable solutions offer an economic alternative to plug-in solutions, if the skills of maintenance personnel and operating requirements allow intervention on downstream connections. Okken increases the safety level of the disconnectable FU by means of a draw-out safety device and use of double-clamps for the busbar connection.

The description is the same as the Polyfast plug-in FU, except for the downstream clamps : the downstream cables are directly connected to the downstream terminals of the device.

The auxiliaries are cabled to sliding withdrawable auxiliary blocks. The operating mechanisms are accessible behind the door.

* **Live work must be carried out by authorised personnel.**

Withdrawable FU



The drawer is used to make up a FU consisting of several mechanically attached devices, that can assume the “plug-in / test / draw-out / withdrawn” positions, allowing the padlocking procedures and incorporating the man/switchboard interface elements on the front panel.

These functions are particularly important in motor control. In distribution, the need to indicate and control on the front panel of the FU and the necessity to padlock are the main choice criteria for this solution.

The fixed part can be installed and removed with power on and supports the upstream and downstream plug-in clamps.

The moving part supports the switchgear by means of an interface or a mounting plate. It is guided in its movement and positioning, and ball bearings minimise the operating effort.

The “plug-in / test / draw-out” positions are mechanically marked by an indexing device associated with a mechanical indicator on the front panel.

The front panel of the drawer gives priority to ergonomics and intuition of operations by the arrangement of the locking facilities and operating mechanisms.

Access to the inside of the drawer may be necessary during operation, to make settings or carry out a thermographic check. A deliberate opening by swivelling the front panel is possible using a tool.

Operating safety is guaranteed by a mechanical device disabling working when the protection device is closed (for drawers equipped with Compact NS80, NS100 to NS630, GV7, and GS1 fuse-switches). An IP 2X degree of protection is maintained in the test and draw-out positions. Locking is possible in all positions by a padlock (3 padlocks not supplied), as is also padlocking of empty compartments.

Downstream connections are made in the fixed part on connection bars. The auxiliaries are connected to sliding blocks attached to the fixed and moving parts which considerably reduce cabling.

Test position : power circuits are isolated upstream and downstream, while the control circuits remain connected in order to check off-load operation of the auxiliary circuits and automation systems.

Polyfast drawer

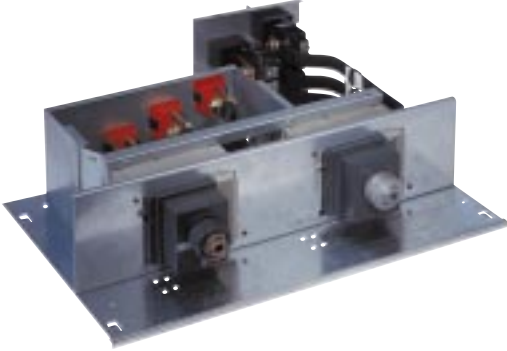
The switchgear is mounted on a Polyfast interface. This solution is used for distribution feeders by Compact NS100 to NS630 circuit-breaker. It is also chosen in motor control for feeders of the “line starter” type, protection of which is ensured by a Compact NS100 to NS630 or GV7 circuit-breaker.

Versatile drawer

Mounting plates adapted to the devices support the various components of the Functional Unit. This very open solution is applied in all other cases (for example : motor control feeder with GV2 or “line starter” equipped with an NS80 circuit-breaker) and is available in full-width and half-width drawers.

* *Live work must be carried out by authorised personnel.*

FU on mounting plate, fixed device or plug-in on base device



This type of functional unit combines the savings of a fixed solution with the flexibility provided by plugging in on busbar. The devices, of the fixed or plug-in on base type, are mounted on a support assembly equipped with clamps allowing addition of a feeder with reduced breaking time. This assembly is completely assembled and cabled on table, including any current transformers required. A mechanical device prevents untimely removal of the FU, removal of which requires section switching off. Two devices (up to 250A) can be installed on the same mounting plate. The downstream cables are connected on connection bars or terminals in the side or rear compartment. The operating mechanisms are accessible on the front panel through an individual door. This solution combining total separation of FUs from one another and an individual door allows assembly of completely partitioned switchboards (3b form minimum).

Choice of plug-in devices means they can be extracted for maintenance or modification of rating without interrupting the power supply.

Disconnectable mounting plate FU



The disconnectable mounting plate FU is used in small distribution and for low rating motor feeders with direct starting (which represent the majority of feeder units). This solution, for front connection, optimises cost and installation capacity while giving priority to interchangeability and flexibility of live reconfiguration*. It requires intervention on downstream connections on extraction. This FU consists of a fixed part, that can be installed and removed with power on*, equipped with upstream plug-in clamps (double-clamps) and of a moving part supporting the devices, of fixed type. The downstream cables are connected to the device terminals and the auxiliaries to connectors. The operating mechanisms are accessible behind the door.

Jean Müller fuse-switch disconnectable FU



Protection of distribution feeders by horizontal fuse-switch 160A (size 00) to 630A (size 3) in front connection, satisfies the habits of certain countries. Okken allows functional, tested integration of such units, complying with the specifications of the fuse-switch manufacturer in order to guarantee the heat loss level required. All the accessories equipping these devices can be implemented. The downstream connections are made on terminals built into the device. Access to fuses is interlocked with the switch.

* Live work must be carried out by authorised personnel.

Summary of functional units

installation mode	applications	connections IEC 60439-1	IS	forms IEC 60439-1
withdrawable on chassis	DF	WWW	332	3b-4b
fixed on mounting plate	DF	FFF	211	3b-4b
plug-in on base, on mounting plate	DF	WWW	232	3b-4b
Jean Müller fuse-switch disconnectable	DF	WFD	223	3b-4b
disconnectable mounting plate	DF MCF	WFD	223	2b
disconnectable Polyfast	DF	WFW	223	4a
plug-in Polyfast	DF	WWW	233	3b-4b
withdrawable in Polyfast drawer	DF MCF	WWW	333	3b-4b
withdrawable in versatile drawer	MCF	WWW	333	3b-4b
withdrawable in 1/2 width drawer	DF MCF	WWW	333	3b-4b

Df : distribution feeder
mcf : moteur control feeder:
1, 2 or 3 devices for 1 starter. Type 2 co-ordination, IEC 60947-4.

Switchgear installed

- Masterpact NW and NT high power circuit-breakers withdrawable on chassis, manual operating mechanism or motor mechanism through door
- Fixed or plug-in Compact NS moulded case circuit-breaker, toggle, rotary handle or motor mechanism, through door, behind door, or in drawer.
- Contactors and thermal relays
- Fuse switches
- Disconnectable fuse-switches
- Measuring and metering devices
- LV/LV transformers
- Relays
- Automation systems
- etc.

Summary of the installation and control types

installation mode	Masterpact NW/NT Compact NS1600	Compact NS400/630 NS100/250	GV7 NS400/630 NS100/250 + discontactor	GV2/Integral NS80 + discontactor	sectionneur- fusible Jean Müller	Multi 9
withdrawable on chassis	M/E through door					
fixed on mounting plate	M/R/E through door					
plug-in on base, on mounting plate	M/R through door					
fuse-switch disconnectable	M/E direct					
disconnectable mounting plate				M behind door	M behind door	
disconnectable Polyfast	M/R/E behind door					
plug-in Polyfast	M/R/E behind door					
withdrawable in drawer Polyfast	R on front plate E behind front plate		R on front plate			
withdrawable in versatile drawer				R on front plate	R on front plate	

M : manual control with toggle or energy storage
R : direct rotary or extended handle (in drawer)
E : electrical (motor mechanism)

distribution incomers and feeder units	connection type	installation mode					
		withdrawable on chassis	disconnect. plug-in Polyfast	drawer	fixed and plug-in on mounting plate	disconnect. mounting plate	fuse-switch disconnect.
NW40b-NW63	BDC-RC H2350	72 mod					
NW40b-NW63	BDC-RC H2200	66 mod					
NW08-40/NT16/NS1600	RAR-SC-TDC	19 mod					
NW08-40/NT16/NS1600	BDC H2350	38 mod					
NW08-40/NT16/NS1600	BDC H2200	32 mod					
NT16/NS1600 mixed with FU<=630A	RC	18 mod					
NT16/NS1600 mixed with FU<=630A	SC-TDC-BDC	30 mod					
NS250 3P	all		5 to 6 mod	6 mod	6 mod		
NS250 3P VIGI	all				6 mod		
2 NS250 3P without VIGI	all				6 mod		
NS250 4P	all		7 mod	8 mod	8 mod		
NS250 4P VIGI	all				8 mod		
2 NS250 4P without VIGI	all				8 mod		
NS630 3P	all		8 mod	12 mod	8 mod		
NS630 3P VIGI	all				8 mod		
NS630 4P	all		9 mod	12 mod	10 mod		
NS630 4P VIGI	all				10 mod		
multi 9	all			6 mod 1/2 W		2 to 4 mod	
SASIL 00 160 A	SC						2 mod
SASIL 1 250 A	SC						3 mod
SASIL 2 400 A	SC						6 mod
SASIL 3 630 A	SC						6 mod

TDC : top direct connection

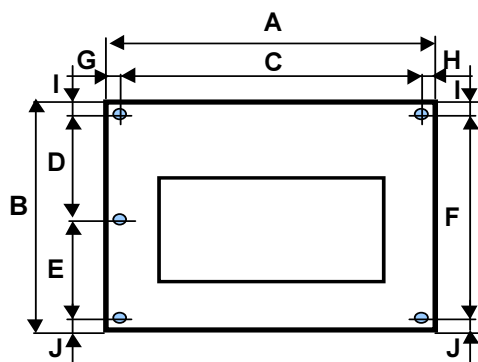
BDC : bottom direct connection

SC : side connection

RC : rear connection

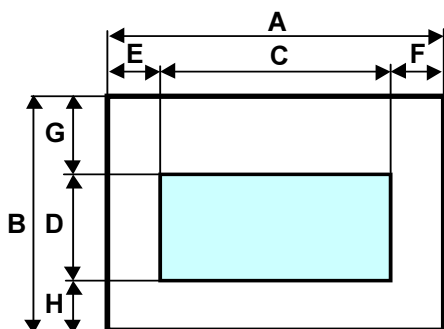
moteur control feeders	power (kW) 400 V	installation mode		coil	
		drawer	disconnectable mounting plate	~	=
with GV2P (without thermal relay)	11	3 mod 1/2 W	2 mod	x	x
with GV2L without fault signal contact	11	6 mod 1/2 W	2 mod	x	x
with GV2L with fault signal contact	11	6 mod 1/2 W	4 mod	x	x
with Integral 18 without aux. contact	9	3 mod 1/2 W	2 mod	x	x
with Integral 18 with aux. contact	9	6 mod 1/2 W	4 mod	x	x
avec Intégral 32	15	6 mod 1/2 W	4 mod	x	x
with Integral 63 without aux. contact	33	6 mod	4 mod	x	x
with Integral 63 with aux. contact	33	6 mod		x	x
with NS80	7,5	6 mod 1/2 W			x
with NS80	22	6 mod 1/2 W		x	
with NS80	30		4 mod	x	x
with NS80	37	6 mod		x	x
with NS100	37	6 mod		x	x
with NS160	75	6 mod		x	x
with NS250	110	12 mod		x	x
with NS400	160	18 mod		x	x
with NS630	250	18 mod		x	x
with GS1	15	6 mod 1/2 W			x
with GS1	22	6 mod 1/2 W		x	
with GS1	37	6 mod		x	x
with GS1	110	12 mod		x	x
with GS1	220	24 mod		x	x

Ground fastening



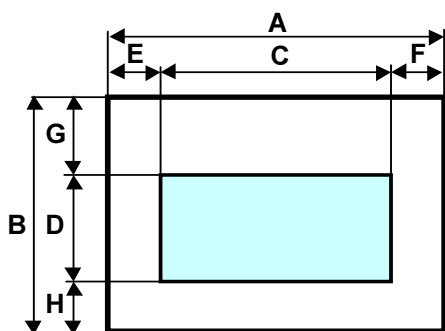
A	B	C	D	E	F	G	H	I	J
650	600	565	262.5	262.5		42.5	42.5	37.5	37.5
650	400	565			325	42.5	42.5	37.5	37.5
450	600	365	262.5	262.5		42.5	42.5	37.5	37.5
450	400	365			325	42.5	42.5	37.5	37.5
350	600	265	262.5	262.5		42.5	42.5	37.5	37.5
350	400	265			325	42.5	42.5	37.5	37.5
250	600	165	262.5	262.5		42.5	42.5	37.5	37.5
250	400	165			325	42.5	42.5	37.5	37.5

Cable entry from the bottom



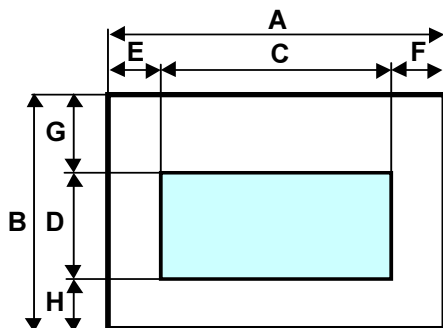
A	B	C	D	E	F	G	H
cubicle 115							
650	600	450	170	140	60	355	75
cubicle 70							
650	600	530	240	60	60	340	20
compartment							
650	600	530	560	60	60	20	20
650	400	530	360	60	60	20	20
450	600	330	560	60	60	20	20
450	400	330	360	60	60	20	20
350	600	230	560	60	60	20	20
350	400	230	360	60	60	20	20
250	600	130	560	60	60	20	20
250	400	130	360	60	60	20	20

Cable entry from the top without busbar



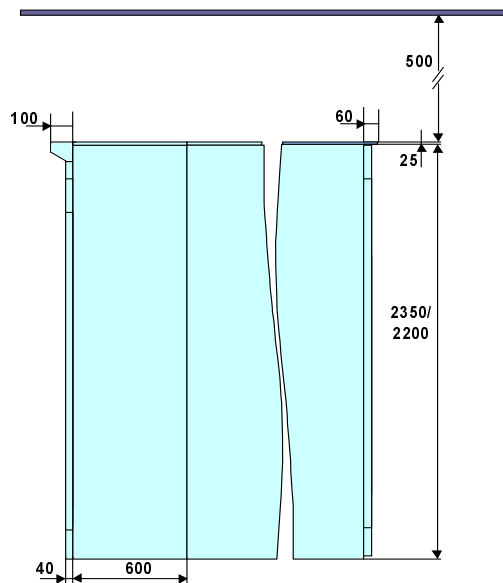
A	B	C	D	E	F	G	H
compartment							
650	600	570	560	40	40	20	20
650	400	570	360	40	40	20	20
450	600	370	560	40	40	20	20
450	400	370	360	40	40	20	20
350	600	270	560	40	40	20	20
350	400	270	360	40	40	20	20
250	600	170	560	40	40	20	20
250	400	170	360	40	40	20	20

Cable entry from the top with busbar



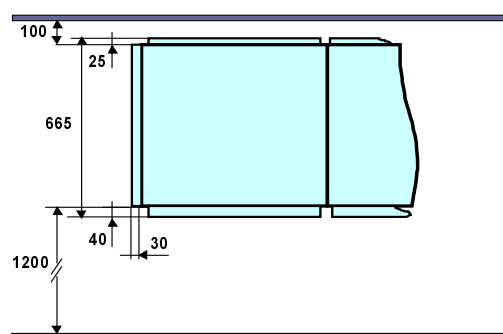
A	B	C	D	E	F	G	H
cubicle 115							
650	600	460	210	120	70	335	55
cubicle 70							
650	600	290	200	110	250	360	40
compartment							
650	600	570	260	40	40	320	20
450	600	370	260	40	40	320	20
350	600	270	260	40	40	320	20
250	600	170	260	40	40	320	20

Top connection

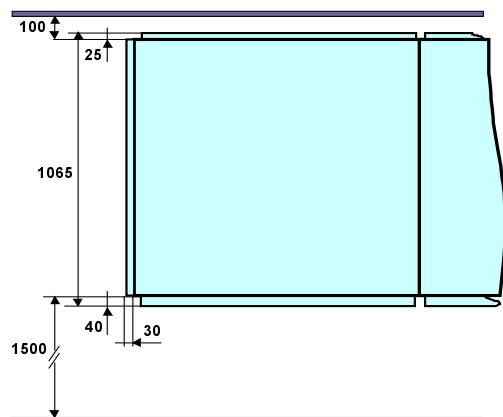


Cubicle seen from the side : clearance under ceiling

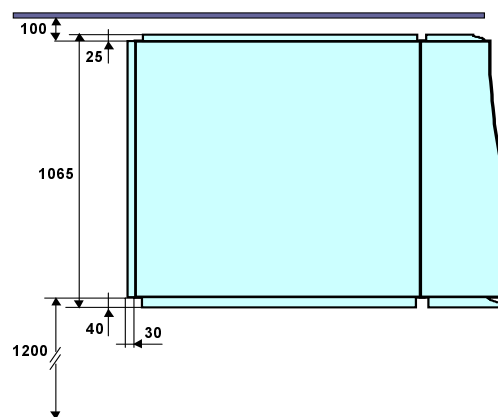
Front connection



Front connection cubicle ≤ 4000 A : minimum space at the front and rear

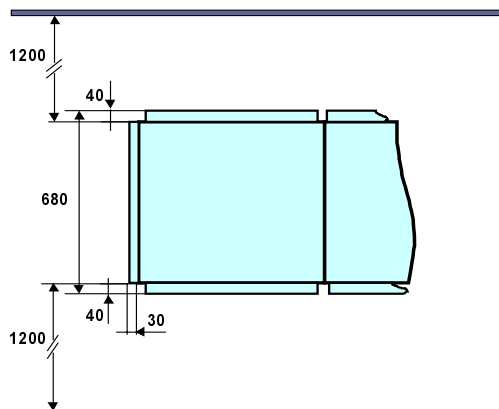


Front connection cubicle NW40b/50/63 4 poles : minimum space at the front and rear

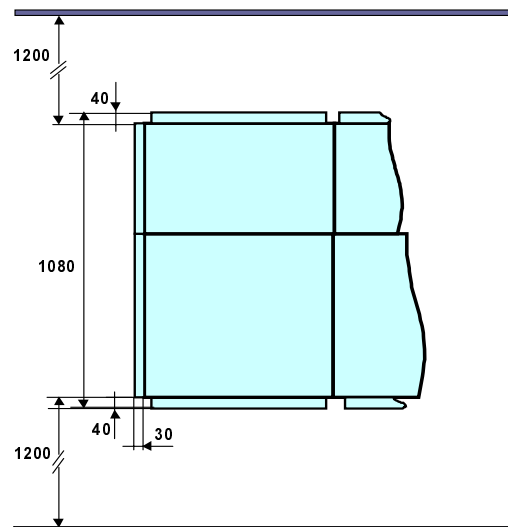


Front connection cubicle NW40b/50/63 3 poles : minimum space at the front and rear

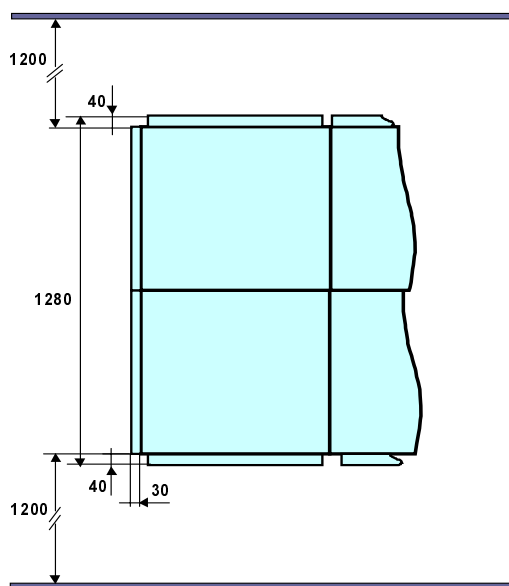
Rear connection



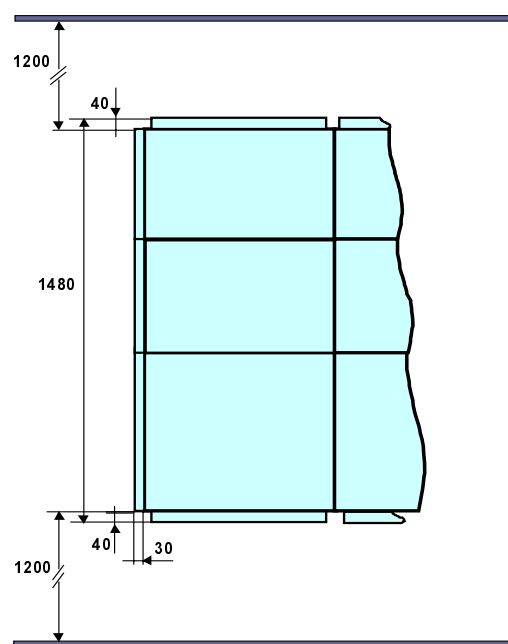
Rear connection cubicle, depth 600 :
minimum space at the front and rear



Rear connection cubicle, depth 1000 :
minimum space at the front and rear






Rear connection cubicle, depth 1200 :
minimum space at the front and rear



Rear connection cubicle, depth 1400 :
minimum space at the front and rear

Service rating

The service rating is a characterisation tool for LV switchboards set up by the French manufacturers of electrical switchgear. It allows the users to express their needs as answers to the requirements of their site. It doesn't need any specific knowledge of the applicable standards. It is made of three digits : one per criterion from 1 to 3. The minimum index is 111, the maximum 333

Operation	Maintenance	Evolution
<ul style="list-style-type: none"> - Setting - Locking - Padlocking 	<ul style="list-style-type: none"> - Checking - Cleaning - Repairing 	<ul style="list-style-type: none"> - Addition - Modification - Extension 
<p>Shutting down the whole switchboard 1</p>	<p>Shutting down the whole switchboard 1</p>	<p>Shutting down the whole switchboard 1</p>
<p>Shutting down only the FU concerned (Power + auxiliaries) 2</p>	<p>Shutting down the FU concerned / re-installing requires handling the connexion 2</p>	<p>Shutting down the FU concerned / Reserve slot previously defined & equipped 2</p>
<p>Shutting down only the power of the FU concerned (Aux power maintained / stable test position) 3</p>	<p>Shutting down the FU concerned / connexion handling not required 3</p>	<p>Shutting down the FU concerned / Free evolution 3</p>

With Okken the service rating can be stated considering each functional unit.

Thanks to the functional units combination the selection can be done for each application and the investment reduced to the bare necessities.

Schneider Electric Industries

Postal address

Merlin Gerin Alpes

BP 18

F-73804 Montmélian Cedex

France

Tél : +33 (0)4 79 75 48 00

Fax : +33 (0)4 79 84 28 36

As standards, specifications and designs develop from time to time, always ask for confirmation of the information given in this publication.

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