Fuse Combination Switches

All dimensions are in mm and exclude the handle.
Add 45mm to the depth to allow for the handle (110mm for 630 / 800A)

SPSN		Dimensions (mm)		
	Description	**Width**	**Height**	**Depth**
JFB202U	20A SPSN	200	250	150
JFB203U	32A SPSN	200	250	150
JFD206U	63A SPSN	300	325	150
JFE210U	100A SPSN	375	400	200

TPN		Dimensions (mm)		
	Description	**Width**	**Height**	**Depth**
JFB302U	20A TPN	200	250	150
JFB303U	32A TPN	200	250	150
JFD306U	63A TPN	300	325	150
JFE310U	100A TPN	375	400	200
JFG312U	125A TPN	375	500	200
JFG316U	160A TPN	375	500	200
JFG320U	200A TPN	375	500	200
JFG325U	250A TPN	375	500	200
JFH331U	315A TPN	500	650	300
JFH340U	400A TPN	500	650	300
JFI363U	630A TPN	600	800	350
JFI380U	800A TPN	600	800	350

TPSN		Dimensions (mm)		
	Description	**Width**	**Height**	**Depth**
JFB402U	20A TPSN	200	250	150
JFB403U	32A TPSN	200	250	150
JFD406U	63A TPSN	300	325	150
JFE410U	100A TPSN	375	400	200
JFG412U	125A TPSN	375	500	200
JFG416U	160A TPSN	375	500	200
JFG420U	200A TPSN	375	500	200
JFG425U	250A TPSN	375	500	200
JFH431U	315A TPSN	500	650	300
JFH440U	400A TPSN	500	650	300
JFI463U	630A TPSN	600	800	350
JFI480U	800A TPSN	600	800	350

Cable Extension Boxes for Fuse Combination Switches

		Dimensions (mm)		
	Rating	**Width**	**Height**	**Depth**
JZA701	125 / 250A	375	200	200
JZA702	315 / 400A	500	250	300
JZA703	630 / 800A	600	300	350

Switch Disconnectors

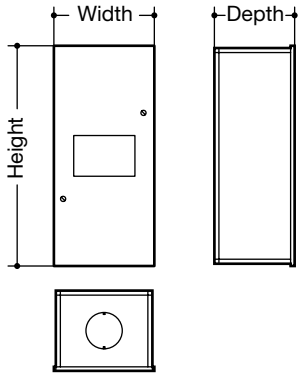
All dimensions are in mm and exclude the handle.

3 Pole		Dimensions (mm)			
	Description	**Width**	**Height**	**Depth**	**Handle Depth**
JAC316	160A TPN	250	300	150	195
JAE320	200A TPN	375	400	200	245
JAE325	250A TPN	375	400	200	245
JAG331	315A TPN	375	500	200	245
JAG340	400A TPN	375	500	200	245
JAH363	630A TPN	500	650	300	345
JAH380	800A TPN	500	650	300	345

4 Pole		Dimensions (mm)			
	Description	**Width**	**Height**	**Depth**	**Handle Depth**
JAB402B	20A TPSN	175	232	65	78
JAB403B	32A TPSN	175	232	65	78
JAB406B	63A TPSN	175	232	65	81
JAB410B	100A TPSN	200	300	80	97
JAC412B	125A TPSN	200	300	80	97
JAC416	160A TPSN	250	300	150	195
JAE420	200A TPSN	375	400	200	245
JAE425	250A TPSN	375	400	200	245
JAG431	315A TPSN	375	500	200	245
JAG440	400A TPSN	375	500	200	245
JAH463	630A TPSN	500	650	300	345
JAH480	800A TPSN	500	650	300	345

Thermal current Ith (40ºC)	20A		32A		63A		100A		125A		160A		200A	
Fuse size: BS	A1		A1		A2-A3		A4		B1-B2		B1-B2		B1-B3	
Rated insulated voltage														
Ui (V)	800		800		800		800		800		800		800	
Impulse voltages Uimp	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	12000	12000	-	
Operational current Ie (A)	A	B	A	B	A	B	A	B	A	B	A	B	A	B
415V ac AC-22A/AC-23B	20	20	32	32	63	63	100	100	125	125	160	160	200	200
Motor power (kW) 400V ac	9		15		30		51		63		80		100	
Reactive power 400V ac (kVAR)	15		45		25		45		55		60		75	
Overload capacity														
Short-circuit with fuses (kA Rms)	50		50		50		50		50		50		50	
Fuse rating (A) BS 88	20		32		63		100		125		160		200	
Making & Breaking Capacity														
Breaking capacity 400V AC-23B (A Rms)	160		256		500		800		1000		1280		1600	
Making capacity 400V AC-23B (A Rms)	200		320		630		1000		1250		1600		2000	
Withstand mechanical (number of operations)	20,000		20,000		10,000		10,000		10,000		10,000		10,000	
Tightening torque	2		2		6		9		9		9		20	
Connection (mm²)														
Minimum Cu cable section	2.5		2.5		10		25		35		50		70	
Maximum Cu cable section	16		16		25		95		95		95		240	
Fuse types	NIT20		NIT32		TIS63		TCP100		TF125		TF160		TF200	

Thermal current Ith (40ºC)	250A		315A		400A		630A		800A	
Fuse size: BS	B1-B3		B1-B4		B1-B4		C1-C2		C1-C2-C3	
Rated insulated voltage Ui (V)	800		800		800		1000		1000	
Impulse voltages Uimp	-		-		-		-		-	
Operational current Ie (A) A = Frequent operation B = Infrequent operation	A	B	A	B	A	B	A	B	A	B
415V ac AC-22A/AC-23B	250	250	315	315	400	400	630	630	800	800
Motor power (kW) 400V ac	-		160	160	220	220	355	355	-	
Reactive power 400V ac (kVAR)	-		125		150		2 x 125		-	
Overload capacity										
Short-circuit with fuses (kA Rms)	50		50		50		50		50	
Fuse rating (A) BS 88	250		315		400		630		800	
Making & Breaking Capacity										
Breaking capacity 400V AC-23B (A R.M.S)	2000		2520		3200		-		-	
Making capacity 400V AC-23B (A R.M.S)	2500		3150		4000		-		-	
Withstand mechanical (number of operations)	10,000		10,000		10,000		8000		8000	
Tightening torque (Nm)	-		20		20		40		40	
Connection (mm²)										
Minimum Cu cable section	70		185		185		2 x 150		2 x 150	
Maximum Cu cable section	240		240		240		2 x 300		2 x 300	
Fuse types	TKF250		TKF315		TMF400		TTM630		TLM800	



Switch Fuses

	Dimensions (mm)					
	Width	**Height**	**Depth**	**Depth with Door**	**Connection**	**Knockouts**
IU4-16	115	187	61.5	-	Earth only	2 x 25mm
IU44-18	125	312	73.5	-	Earth only	None
IU44-11	125	312	73.5	-	Earth only	None
IU4-16-D	125	312	74	96	Earth only	None
IU4-18-D	125	312	74	96	Earth only	None
IU4-11-D	125	312	74	96	Earth only	None

IP65 Enclosed Isolating Switch

All dimensions are in mm and exclude the handle.
Add 27mm to the depth to allow for the handle on 10-25A products.
Add 32mm to the depth to allow for the handle on 40-80A products.

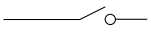
		Dimensions (mm)		
	Description	**Width**	**Height**	**Depth**
JG00S	10A TPN	100	136	74
JG01S	16A TPN	100	136	105
JG02S	25A TPN	100	136	105
JG03S	40A TPN	136	201	105
JG04S	63A TPN	136	201	118
JG05S	80A TPN	136	201	118

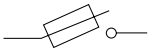
Enclosed thermal current I_{the}	**16**	**25**	**40**	**63**	**80**
Rated insulation voltage U_i (V)	690	690	690	690	690
Rated thermal current I_{the} (A)	25	40	63	80	100
Rated operational current					
AC21 400V Ie (A)	25	40	63	80	100
AC22 400V	16	25	40	63	100
AC22 400V cos phi 0.65	16	20	32	63	100
AC23 400V	16	20	32	63	100
AC23 400V cos phi 0.35	16	15	25	40	63
Rated operational power					
AC23 230V (kW)	4	5.5	7.5	11	15
AC23 400V	7.5	11	15	22	30
Rated fused short circuit current					
Back-up fuse (A)	63	63	63	80	100
R.M.S value Ik (kA)	50	50	50	50	50
Peak value (kA)	5.4	6.6	7.2	8.3	8.7
Rated short circuit making capacity (Icm) (kA) 690V	2.5	2.5	2.5	3.3	3.3
Rated short time withstand current (Icw) (kA) 690V (1s)	1	1.1	1.6	1.7	2.3
Rated breaking capacity Icn (A) AC23					
400V cos phi 0.35	250	270	320	480	504
Electrical endurance (number of operations)	3000	3000	3000	3000	-
Mechanical endurance (number of operations)	50,000	50,000	50,000	50,000	-
Terminals mm^2	1.5 - 16	1.5 - 16	1.5 - 16	2.5 - 35	2.3 - 35
Max. thermal torque (Nm)	1.8	1.8	1.8	2.5	2.5

Enclosed thermal current I_{the}	**20**	**32**	**63**	**100**	**125**	**160**	**200**	**250**	**315**	**400**	**630**	**800**
Rated insulation voltage U_i (V)	800	800	800	800	800	800	800	800	800	800	1000	1000
Rated thermal current I_{the} (A)	20	32	63	100	125	160	200	250	315	400	630	800
Rated operational current												
AC21A 500VAC	20	32	63	100	125	160	160	250	250	250	630	800
AC22A	20	32	63	100	125	125	125	250	250	250	500	800
AC21A 690VAC	20	32	63	100	125	160	160	200	200	200	500	800
AC22A	20	32	63	100	125	125	125	125	125	125	315	800
Overload capacity												
Icw rated short time withstand value (kA/s)	1.26	1.26	1.5	1.5	7	7	7	9	9	9	13	26
R.M.S value (kA)	0.16	0.256	0.504	0.64	1	1.28	1.28	2	2	2	5.04	6.4
Peak withstand value (kA)	-	-	-	-	20	20	18	30	23	23	45	55
Rated short circuit making capacity (kA)	1.8	1.8	2.1	2.1	11.9	11.9	11.9	15.3	15.3	15.3	26	54.6
Rated impulse withstand voltage Uimp (kV)	8	8	8	8	8	8	8	8	8	8	12	12
Mechanical endurance (number of operations)	100,000	100,000	100,000	100,000	10,000	10,000	10,000	10,000	10,000	5,000	5,000	5,000
Maximum cable size	16	16	50	50	50	95	95	150	185	240	2 x 300	2 x 300
Tightening torque (Nm)	2	2	4	4	9	9	9	20	20	20	20	-

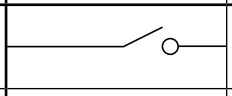
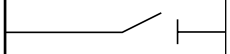
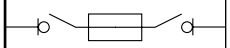
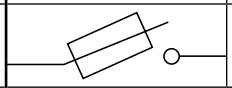
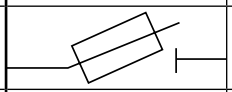
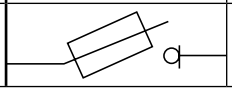
Product Reference	**JAB402B**	**JAB403B**	**JAB406B**	**JAB410B**	**JAC412B**
Thermal Current In	20A	32A	63A	100A	125A
Switch	3PSN	3PSN	3PSN	3PSN	3PSN
Rated Insulation Voltage Ui	800V	800V	800V	800V	800V
Rated Impulse Voltage Uimp	8kV	8kV	8kV	8kV	8kV
Dimensions					
Height (mm)	232	232	232	232	300
Width (mm)	175	175	175	175	200
Depth (mm)	81	81	81	81	83
Operational Current Ie (A)					
415V AC - AC21A / AC21B	20/20	32/32	63/63	100/100	125/125
415V AC - AC22A / AC22B	20/20	32/32	63/63	100/100	125/125
415V AC - AC23A / AC23B	20/20	32/32	63/63	100/100	125/125
500V AC - AC21A / AC21B	20/20	32/32	63/63	100/100	125/125
500V AC - AC22A / AC22B	20/20	32/32	63/63	100/100	125/125
500V AC - AC23A / AC23B	20/20	25/25	63/63	80/80	100/100
690V AC - AC21A / AC21B	20/20	32/32	63/63	100/100	125/125
690V AC - AC22A / AC22B	20/20	32/32	40/63	80/100	100/126
690V AC - AC23A / AC23B	20/20	25/25	40/40	63/63	63/63
Operational Power in AC-23 (kW)					
At 415V AC	9	15	30	45	55
At 500V AC	9	15	30	45	55
At 690V AC	11	15	30	45	55
Overload Capacity					
Fuse rating	20	32	63	100	125
Fused Icc	50	50	50	25	25
Icw	2.5 / 0.3s	2.5 / 0.3s	3.0 / 0.3s	5.0 / 0.3s	5.0 / 0.3s
Ipk	6	6	9	12	12
Cable Connection					
Max Cu cable CSA mm^2	16	16	35	70	70

Fuse - Combination Units - BS EN 60947-3
Many people are attracted to fuse-combination units by their simplicity in application and their reliability in operation. They are particularly useful for use on very high prospective fault level systems where the high energy limiting characteristic of the HRC fuse can be effectively utilised. In the past fuse-combination units came in two forms:

Switch Fuse  A switch in which one or more poles have a fuse in series.

Fuse Switch  A switch in which one or more poles have a fuse carrier/link which forms the moving contact.

The definitions of these two basic types of fuse combination units have now been extended to include units suitable for making, breaking and isolation and units which are only suitable for providing isolation for maintenance work.

Definition	Symbol	Function
Switch Fuse		Making and breaking current
Disconnector Fuse		Isolating
Switch Disconnector Fuse		Making, breaking and isolating
Fuse Switch		Making and breaking current
Fuse Disconnector		Isolating
Fuse Switch Disconnector		Making, breaking and isolating

However, in order to keep the selection of fuse-combination units as simple as possible, Hager offer a range of high performance double break switch-fuses, which also satisfy the isolating requirement of the British standard. These are correctly shown as and defined as a Fuse Combination Switch.

Switch disconnectors - BS EN 60947-3. A range of switch disconnectors (isolators) are available for use on lower current ratings from 20A to 125A, these switches are rated at AC-22 and provide a cost effective alternative to the fuse combination switch especially where the utilisation category AC-23 is not required. ie; mixed resistive and inductive loads.

Utilisation categories
Utilisation categories are not new but they are important because they help the designer or specifier identify the correct unit for a particular application.

The designation of the utilisation category is made up of three parts:

1. The prefix AC or DC, which indicates the nature of the current.
2. The two digit number, which indicates the type of application the unit is suitable for:
   - 20 Connecting and disconnecting under no-load.
   - 21 Switching of resistive loads.
   - 22 Switching of mixed resistive and inductive loads.
   - 23 Switching of highly inductive loads.
3. The suffix A or B, which indicates whether the unit is suitable for frequent or infrequent operation.

A Frequent operation
B infrequent operation.

For example a fuse-combination unit feeding a 400V AC circuit of mixed resistive and inductive loads which would need to be operated frequently would require a minimum utilisation category of AC-22A.

If the load was highly inductive, i.e. motor loads, then the minimum utilisation category would be AC-23A.

Generally, category AC-23 does not cover the switching of capacitors. Usually this is the subject of agreement between manufacturer and user.

Motor Power Circuit Protection
Fuse-combination units can be used very effectively for motor power circuit protection, the energy limiting HRC fuse offering very good protection to its associated starter. Category AC-23A should be specified for this duty. Special motor circuit protection fuse links are available which eliminate the need to fit a larger bodied fuse just to take care of the starting current of the motor.

The protection of motor power circuits should not be confused with the direct switching of a single motor. If a fuse-combination unit is required to perform this function then it must comply with the requirements of Appendix A of BS EN 60947-3 which makes provision for different utilisation categories for this application.