

Switch Disconnectors Capabilities Catalogue



-  Cam switches
-  Photovoltaic switches
-  Load Break switches
-  Fuse switches
-  Changeover switches
-  Bypass switches



IPD Industrial Products is an Australian owned leading manufacturer & distributor of a wide variety of low voltage electrical, lighting, energy management and industrial control products for the Australian Industry.

IPD traces its beginnings to the General Electric Company Ltd of England, founded in 1886. The history of GEC can be found on our website "About Us". Over the years, the company integrated the major electrical businesses of GEC, English Electric, Marconi, WT Henley, Elliot Bros and A.E.I to comprise one of the most extensive and diverse electrical engineering and manufacturing organisation in the world.

In 1956, English Electric company opened its operation at Regents Park in Sydney, and since then has provided employment and training to thousands of people in the Australian electrical industry. Today the business is a much changed and diverse organisation, renamed IPD Group Limited subsequent to the management buyout in 2005 and is proudly a 100% Australian owned, managed and operated company.

IPD Industrial Products delivers high quality & reliable electrical equipment incorporating leading-edge developments and world class manufacturers a powerful presence in Australia.

Our company's commitments are to provide premium customer service, a solutions based offering and to influence the specification and demand for technically compliant quality products.

IPD designs and manufactures a large range of products specifically suited to Australia. Our engineering team develops, tests and certifies equipment ensuring conformity to Australian and International Standards delivering the highest customer satisfaction.

You can find all IPD product catalogues, technical source material, CAD blocks, reference material, specification and test certification on our knowledge based website; www.ipdgroup.com.au

Keith Toose
Managing Director



JEAN MÜLLER 
the name for safety

telergon
gorlan team



CEFEM 
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CONTENTS:


7 - 10



	Cam + light duty isolators	Page
	On / Off door mount	7
	Changeover with off position	9
	Changeover without off position	9
	Enclosed cam switches	10
	IPW series 20 - 63A	10
	W66 series 20 - 63A	10


11 - 14



	Photovoltaic switches	11
	Isolators 32 to 1250A 1000V DC	12
	Enclosed PV isolators	14


15 - 22



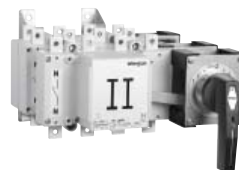
	Switch disconnectors	15
	C&S load break switches up to 3150A	16
	Enclosed switches up to 400A	18
	GE ML base mount On / Off	20
	GE Dilos switches up to 315A	21
	GE enclosed switches in polyester up to 160A	22

23 - 30



	Fuse switches	23
	C&S fuse switches up to 800A	24
	C&S enclosed fuse switches up to 400A	26
	DIN disconnectors up to 1600A	28
	Modstack switches up to 630A	29
	Ministack switch system up to 800A	30


31 - 38



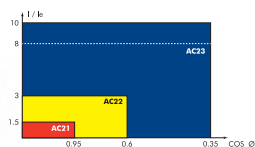
	Changeover switches	31
	Technoelectric C/O switches up to 125A	32
	C&S C/O switches up to 1600A	32
	Enclosed C/O switches	34
	Telergon bypass switches	36
	Telergon C/O switches	37


39 - 42



	Enclosed switchgear	39
	CEFEM enclosed mining switches	41
	Light duty / commercial	42
	Industrial and mining	42

44 - 51



	Technical section	44
	Switch definitions and symbols	44
	Applications	46
	Testing requirements	46
	Motor starting data	49

Range & Selection Guide



CAM + LIGHT DUTY ISOLATORS



- On / Off (20 - 80A)**
- Finger proof terminals
 - IP65 handle
 - Ergonomic handle



- Changeover (20 - 80A)**
- Finger proof terminals
 - IP65 handle
 - Ergonomic handle



- Switches up to 690V**
- Tested to IEC947.3
 - Motor switching AC23
 - Up to 100A

PHOTOVOLTAIC SWITCHES



- Isolator (1000V / Leg)**
- DC21B up to 32A
 - DIN profile
 - Includes links



- Isolator (1000V / Leg)**
- DC21B up to 50A
 - DIN profile
 - Includes links



- Isolator 1000V DC**
- DC21B up to 1250A
 - Optional link bars
 - Optional handles

SWITCH DISCONNECTORS



- Switches (up to 690V AC)**
- Tested to IEC947.3
 - Suitable for motors
 - Up to 3150A



- Switches (up to 690V AC)**
- Tested to IEC947.3
 - Full visible contacts
 - Up to 315A



- Enclosed Switches (Poly)**
- Tested to IEC947.3
 - Motor switching AC23
 - Up to 160A

FUSE SWITCHES



- Fuse Switches (up to 415V AC)**
- Suit BS or NH DIN fuses
 - Up to 1250A
 - IP65 Handles



- DIN Disconnect (up to 690V AC)**
- Shrouded terminals
 - Up to 1600A
 - Suit NH DIN fuse links



- Modstack (up to 690V AC)**
- High filling factor
 - Up to 630A
 - Suit NH DIN fuse links
 - Plug-in up to 80kA

CHANGEOVER SWITCHES



- C/O Switches (up to 690V AC)**
- Compact design
 - 63A and 125A
 - DIN profile C/W Handle



- C/O Switches (up to 415V AC)**
- New compact design
 - 100A up to 200A
 - IP65 Handle



- C/O Switches (up to 415V AC)**
- Tested to IEC947.3
 - Small foot print
 - Up to 1600A

Range & Selection Guide



Enclosed Cam Switches
 - Degree of protection IP65
 - Up to 500V AC
 - C/O & Reversing Switches



IPW (20 - 63A)
 - Degree of protection IP66
 - 4 x M25 Entries
 - 1P, 3P and 4P models
 - AS3133 / IEC947.3



W66 (20 - 63A)
 - Degree of protection IP66
 - 1 x M32 + 2 x M25
 - 2P and 3P versions
 - Tested AS3133 / IEC947.3



Isolators (1000V / Leg)
 - DC21B up to 32A
 - Padlockable handle
 - Degree of protection IP65



Isolators (1000V / Leg)
 - DC21B up to 32A
 - Padlockable handle
 - Degree of protection IP65



W66 (1000V / Leg)
 - DC21B up to 32A
 - 4 x M25 entries
 - Padlockable handle
 - Degree of protection IP66



Enclosed Switches (metal)
 - Tested to IEC947.3
 - Motor switching AC23
 - Up to 400A



Enclosed Mining Switches
 - Visible window - Metal/Poly/Stainless steel
 - Up to 800A - Optional control buttons
 - Side operation



Ministack
 - Typed tested design - Future spaces
 - Removable cassette - Easy to extend
 - Up to 800A - Proven design
 - Suit BS fuse links - Australian made



Enclosed Fuse Switches (metal)
 - Tested to IEC947.3
 - Motor switching AC23
 - Up to 400A



Bypass switches (up to 690V AC)
 - 250A up to 630A
 - Small foot print / compact
 - High short cct strength



Enclosed C/O Switches (poly)
 - Tested to IEC947.3
 - 3P and 4P designs
 - Up to 125A



Enclosed C/O Switches (metal)
 - Tested to IEC947.3
 - Degree of protection IP65
 - Up to 200A

CAM SWITCHES

PHOTOVOLTAIC SWITCHES

SWITCH DISCONNECTORS

FUSE SWITCHES

CHANGEOVER SWITCHES

Device Options



Switch Type	Handle / Shaft	Mounting		Visible Contacts	Fuses		Motor Drive	Enclosed IP65/66
		Door	Base		BS	NH DIN		
Cam Switches								
Telergon Cam			-	-	-	-	-	-
GE ML Cam			-	-	-	-	-	-
W66 series		-		-	-	-	-	
IPW series		-		-	-	-	-	
Photovoltaic Isolators								
ZFV32		-		-	-	-	-	
TFV50		-		-	-	-	-	
S5000 series	-	-		-	-	-	-	-
Switch Disconnectors								
CSSD series		-			-	-	-	-
Dilos series	-	-			-	-	-	-
CEFEM mining	-	-			-	-	-	
Fuse Switches								
C&S series		-		-			-	
DIN disconnectors	-	-		-	-		-	-
Modstack	-	-		-			-	-
Ministack	-	-		-			-	-
Changeover Switches								
Techno series		-		-	-	-	-	
C&S series		-			-	-	-	
Telergon C/O	-	-		-	-	-		-
Telergon bypass	-	-		-	-	-	-	-

APPROVALS:

IPD switch range is tested to international standards & norms. Some of these are listed here.



CAM Switches 25 - 125A

Features:

- Door mounting red yellow handle.
- Large cable entries.
- 4 hole fixing.
- IP65 handle.
- AC23 switching capability.
- Blank labels.
- Tested to IEC947.3.

Benefits:

- Hi-visibility.
- Accepts large cables.
- Good mechanical strength.
- Suitable for outdoor installation.
- Ideal as motor isolators.
- Engrave descriptions to local requirements.
- Long term reliability.



CAM SWITCHES



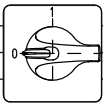
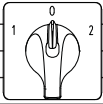
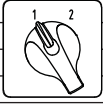
CAM Switches



2 Padlocks



3 Padlocks

Range				
	ON/OFF 1P	-	-	
	ON/OFF 2P	-	-	
	ON/OFF 3P	-	-	
	ON/OFF 4P	-	-	
	C/O with OFF 1P	-	-	
	C/O with OFF 2P	-	-	
	C/O with OFF 3P	-	-	
	C/O with OFF 4P	-	-	
	C/O without OFF 1P	-	-	
	C/O without OFF 2P	-	-	
	C/O without OFF 3P	-	-	
	C/O without OFF 4P	-	-	
	Reversing switch 3 phase	-	-	
	Voltmeter switch P-P + P-N	-	-	
	Ammeter switch CT driven	-	-	
	ON / OFF 3P up to 2 padlocks (one hole fixing)	789174	789175	
	ON / OFF 3P up to 3 padlocks (one hole fixing)	789178	789179	
	ON / OFF 3P 4 Hole mounting	789186	789187	
	Neutral add-on block (3P Switch + N)	789250	789250	
	Mounting	1 hole	1 hole	
Operation				
Thermal current	Ith (A)	25	40	
Enclosed thermal current	Ithe (A)	25	32	
Operating voltage	Ue (V)	690	690	
Insulation voltage	Ui (V)	690	690	
Impulse withstand	Uimp (kV)	6	6	
Operational power (415V)	P (W)	11	15	
Short-Time withstand (1 sec)	Icw (kA)	0.3	0.48	
Covers				
	Terminal covers 1 pole	789270	789270	
	Terminal covers 3 pole ¹⁾	789272	789272	
Legend Plates				
	Blank legend plates	-	-	
Auxiliary Contacts				
	1 x C/O contact	789268	789268	
Dimensions				
Connections	Tag	Tunnel	Tunnel	
	Cable range	1.5-10mm²	1.5-10mm²	
Outline dimensions	Width 3 pole (mm)	45	45	
	Width 4 pole (mm)	54	54	
	Height (mm)	78	78	
	Depth (mm)	55	55	

1) 1 x 3P cover supplied with each switch as standard.



Covers



Auxiliary Contacts



Legend Plate

CAM Switches



4 Hole mount



4 Hole mount



4 Hole mount



-	-	-	CS010T20	CS010T32	CS010T63
-	-	-	CS011T20	CS011T32	CS011T63
-	-	-	CS012T20	CS012T32	CS012T63
-	-	-	CS013T20	CS013T32	CS013T63
-	-	-	CS400T20	CS400T32	CS400T63
-	-	-	CS401T20	CS401T32	CS401T63
-	-	-	CS402T20	CS402T32	CS402T63
-	-	-	CS403T20	CS403T32	CS403T63
-	-	-	CS500T20	-	-
-	-	-	CS501T20	-	-
-	-	-	CS502T20	-	-
-	-	-	CS503T20	-	-
-	-	-	CS102T20	-	-
-	-	-	CS705T20	-	-
-	-	-	CS720T20	-	-
-	-	-	-	-	-
-	-	-	-	-	-
789188	789189	789190	-	-	-
789252	789252	789254	-	-	-
4 hole	4 hole	4 hole	4 hole	4 hole	4 hole
63	80	125	25	40	80
50	63	100	25	40	80
690	690	690	500	690	690
690	690	690	690	690	690
6	6	6	6	8	8
30	37	45	7.5	15	37
0.77	0.96	1.5	0.4	0.73	1.6
789271	789271	789271	-	-	-
789273	789273	789274	-	-	-
-	-	-	CST20LABEL	CST32LABEL	CST63LABEL
789268	789268	789268	-	-	-
Tunnel 2.5-35mm ²	Tunnel 2.5-35mm ²	Tunnel 6-70mm ²	Screw 2 x 4mm ²	Screw 2 x 10mm ²	Screw 16mm ²
53.5	53.5	70	Refer IPD	Refer IPD	Refer IPD
75.5	75.5	92			
100	100	100			
72	72	72			



Enclosed CAM Switches 25A

Features:

- Degree of protection IP65.
- Tested up to 500V AC.
- Mounted in W66 1M enclosure.
- C/O switches available in 2 & 4 pole.



W66CO225

Features:

- Degree of protection IP66.
- Maximum cable size 25mm².
- Includes Neutral and Earth terminal.
- Gland entries 4 x M25.
- Tested AS/NZS3947.3:2001.



IPW

Features:

- Degree of protection IP66.
- UV stabilised.
- Stainless steel fittings.
- Fully type tested and approved.



W66IS

ENCLOSED CAM SWITCHES

Rating A	Poles	Description	Cable Size - max	Part No.
25	2	Changeover switch	2 x 4mm ²	W66CO225
25	4	Changeover switch		W66CO425
25	3	Reversing switch		W66RS325

Enclosed Isolators up to 63A

IPW WEATHERPROOF ISOLATORS - IP66

Rating A	Poles	AS3133 M-rating	Voltage Rating	Cable Size - max	Part No.
20	1	140	240V	25mm ²	IPW201
20	3	120	415V		IPW203
20	4	120	415V		IPW204A
35	1	180	240V		IPW351
35	3	160	415V		IPW353
63	1	200	240V		IPW631
63	3	200	415V		IPW633

Dimension: 82.5mmW x 166.5mmH x 70mmD.

W66 MODULAR WEATHERPROOF ISOLATORS

Rating A	Poles	AS3133 M-rating	Voltage Rating	Cable Size - max	Part No.
20	2	100	240V	16mm ²	W66IS220
20	3	100	415V		W66IS320
32	3	100	415V		W66IS332
63	3	200	415V		W66IS363

Dimension: 101mmW x 101mmH x 110mmD.

Photovoltaic Switches 32 - 1800A

Features:

- High DC switching capability.
- Special low resistance knife contacts.
- 32 and 50A models with DIN profile.
- Direct or door handles.
- Enclosed version available.
- Tested to IEC947.3.

Benefits:

- Suitable for large arrays.
- High efficiency.
- Suit any DIN slot enclosure.
- Flexible mounting options.
- Reduced installation time.
- Reliability.



PHOTOVOLTAIC SWITCHES



Photovoltaic Switches



Range		TFV5011	TFV5022	ZFV32	-
Direct Mount Handle Padlockable		TFV5011	TFV5022	ZFV32	-
Switch Only		-	-	-	TFV5041
Mounting		DIN/BASE	DIN/BASE	DIN/BASE	BASE
Operation					
Insulation voltage	U _i (V)	1,500	1,500	1,000	1,500
Impulse withstand	U _{imp} (kV)	6	6	6	6
Operational current	400V DC21B	50	50	32	50
Operational current	500V DC21B	40	50	32	50
Operational current	600V DC21B	25	50	32	50
Operational current	800V DC21B	10	50	32	50
Operational current	900V DC21B	8	50	32	50
Operational current	1,000V DC21B	8	40	32	50
Short CCT making capacity	(kA)	1.45	1.45	-	1.45
Short-Time withstand (1 sec)	I _{cw} (kA)	1.0	1.0	1.0	1.0
Mechanical operations	CO	30,000	30,000	10,000	30,000
Weight	(kg)	0.16	0.24	0.2	0.3
Bridging Links					
Set of bridging links		Included	Included	Included	Included
Covers					
4 pole cover 1 piece		IP20	IP20	IP20	IP20
Auxiliary Contacts					
1 x NO + 1 x NC		-	-	-	-
2 x NO + 2 x NC		-	-	-	-
Handles					
Direct mount handle		Included	Included	Included	-
Door mount handle		-	-	-	TFVHAN
Shafts					
Extension shaft		-	-	-	-
Dimensions					
Connections	Tag	Tunnel	Tunnel	Tunnel	Tunnel
	Tag bolt size	-	-	-	-
	Max cable size	2 x 6mm² 1)	2 x 6mm² 1)	4 - 16mm²	2 x 6mm² 1)
Outline dimensions					
	Width	45	45	60	45
	Height	77	77	96	77
	Depth	74	110	91	142

1) 1 x 10mm² cable via fork lug.



Bridging Links



Handles



Shafts



Covers



Aux Contacts

Photovoltaic Switches



	S501254PRO	S502004PRO	S503154PRO	S508004PC0	S12504CO	S518004PS0
	BASE	BASE	BASE	BASE	BASE	BASE
	1,000	1,000	1,000	1,000	1,000	1,000
	8	8	8	8	12	12
	125	200	315	800	1,250	1,800
	125	200	315	800	1,250	1,800
	125	200	315	700	1,250	1,800
	125	180	280	630	1,000	1,500
	125	160	260	550	870	1,350
	100	160	250	500	850	1,250
	12	20	20	26	60	100
	12	12	12	16	25	50
	20,000	20,000	20,000	10,000	10,000	1,000
	1.4	1.9	1.9	4.5	7.6	20.8
	DS-PI11	DS-PI11	DS-PI11	DS-PI21	DS-PI31	DS-PI41
	DS-CU12	DS-CU12	DS-CU12	DS-CU22	-	-
	D5LAU01	D5LAU01	D5LAU01	D5LAU01	D5LAU01	D5LAU01
	D5LAU02	D5LAU02	D5LAU02	D5LAU02	D5LAU02	D5LAU02
	DS-EI11	DS-EI11	DS-EI11	DS-EI21	DS-EI31	DS-EI41
	DS-EN11	DS-EN11	DS-EN11	DS-EN21	DS-EN31	DS-EN41
	DS-EP11	DS-EP11	DS-EP11	DS-EP21	DS-EP31	DS-EP41
	25 x 25 x 7mm	25 x 25 x 7mm	25 x 25 x 4mm	30 x 30 x 5mm	40 x 30 x 8mm	60 x 75 x 10mm
	M10	M10	M10	M10	M14	M14
	1 x 185mm²	1 x 185mm²	1 x 185mm²	2 x 240mm²	2 x 300mm²	2 x 80 x 7mm
	217	217	217	275	325	441
	167	167	167	235	290	441
	108	108	108	139	154	240

Enclosed Photovoltaic Switches up to 50A



Features:

- Degree of protection IP65.
- 4 x M20/M25 gland entries.
- Padlocking handle, up to 3 locks.
- External fixing points.
- Tested to IEC947.3.



ZFV32E

Features:

- Degree of protection IP65.
- 4 x M20/M25 gland entries.
- Optional key lock.
- External fixing points.



ZFV32KVPC

Features:

- Degree of protection IP66.
- 4 x M25 conduit entries.
- Opaque door.
- Solar isolator marking.
- Sealing point.



W66ZFV32

PV DC ISOLATORS IN POLYCARBONATE ENCLOSURES

IEC947.3 (DC21B)	600V (A)	700V (A)	800V (A)	900V (A)	1000V (A)	Part No.
Current Rating	32	32	32	32	32	ZFV32E

Dimensions: 97mmW x 130mmH x 110mmD.

PV DC ISOLATORS IN POLYCARBONATE ENCLOSURES

IEC947.3 (DC21B)	600V (A)	700V (A)	800V (A)	900V (A)	1000V (A)	Part No.
Current Rating	32	32	32	32	32	ZFV32KVPC
	25	10	10	8	8	TFV5011KVPC

Dimensions: 126mmW x 228mmH x 111mmD.

PV DC ISOLATORS IN POLYCARBONATE ENCLOSURES

IEC947.3 (DC21B)	600V (A)	700V (A)	800V (A)	900V (A)	1000V (A)	Part No.
Current Rating	32	32	32	32	32	ZFV32W66
	25	10	10	8	8	TFV5011W66
	50	50	50	50	40	TFV5022W66

Dimensions: 126mmW x 228mmH x 111mmD.

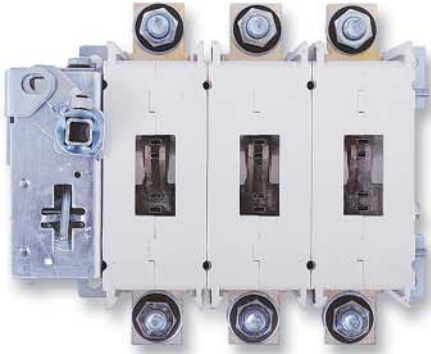
C&S Load Break Switches 160-3150A

Features:

- Visible contact windows in each pole.
- Fully adjustable shafts.
- Optional auxiliary contacts.
- Padlocking on switch.
- Terminal covers.
- Tested to IEC947.3.

Benefits:





- Operator safety.
- Easy to fit.
- Remote indication.
- Safety.
- Protection from direct contact.
- Reliability.



SWITCH DISCONNECTORS



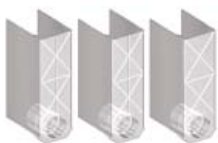
Switch Disconnectors

Range						
3 pole switch	incl. handle & shaft	CSSD160DM3	CSSD250DM3	CSSD400K3	CSSD630K3	
4 pole switch	incl. handle & shaft	CSSD160DM4	CSSD250DM4	CSSD400K4	CSSD630K4	
3 pole switch 185mm Phase centres Mounting	incl. handle & shaft	-	-	-	-	
		BASE	BASE	BASE	BASE	
Operation						
Thermal current	Ith (A)	160	250	400	630	
Enclosed thermal current	Ithe (A)	160	250	400	630	
Operating voltage	Ue (V)	690	690	690	690	
Insulation voltage	Ui (V)	1000	1000	1000	1000	
Impulse withstand	Uimp (kV)	12	12	12	12	
Operational power (415V)	P (W)	75kW	132kW	200kW	315kW	
Short-Time withstand (1 sec)	Icw (kA)	5kA	8kA	20kA	24kA	
Terminal Covers						
	Terminal covers 1 pole	SF702	SF703	SF703	-	
	Terminal covers 3 pole	-	-	-	CSWPL0143²⁾	
	Terminal covers 4 pole	-	-	-	CSWPL0144²⁾	
Auxiliary Contacts						
	1 NO + 1 NC	CSSDF-ZX1	CSSD-ZX37	CSSDF-ZX33	CSSDF-ZX33	
	2 NO + 2 NC	CSSDF-ZX16	CSSD-ZX38	CSSDF-ZX34	CSSDF-ZX34	
Handles						
	Replacement premium IP65	CSWHIP80S6	CSWHIP80S8	CSWHIP145S12	CSWHIP145S12	
	Old handle (pre 2011)	CSDB20	CSDB22	CSDB16	CSDB16	
	Direct mounting kit	-	HMK-2	HMK-1	HMK-1	
Shafts						
	Extension shafts 6 x 340mm	CSP-6X340	-	-	-	
	Extension shafts 8 x 400mm	-	CSP-8X400	-	-	
	Extension shafts 12 x 465mm	-	-	CSP-12X465	CSP-12X465	
	Shaft coupling 12mm	-	-	CSSDZX95	CSSDZX95	
Options						
	Castell locking kit	CSSDZW-15	CSSDZW-4³⁾	CSSDZW-4	CSSDZW-4	
	Changeover mechanism	CSSD-ZW6/1	-	CSSD-ZW11	CSSD-ZW11	
Dimensions						
Connections	Tag	20 x 3mm	25 x 4mm	25 x 4mm	40 x 5mm	
	Bolt size	1 x M8	2 x M10	2 x M10	1 x M12	
	Max cable size	1 x 70mm²	1 x 120mm²	2 x 150mm²	2 x 185mm²	
Outline dimensions	Width 3P (mm)	190	195	211	244	
	Width 4P (mm)	230	240	257	306	
	Height (mm)	142	163	205	223	
	Depth (mm)	124	105	130	130	

1) Based on calculations IEC 947-3, utilisation category B, infrequent operation AC21 @ 415V.

2) 1 piece 3 pole cover, 2 required for complete switch.

3) Modification to lever required not a direct fit to this model.



Terminal Covers



Auxiliary Contacts



Handles







Shafts



Castell Lock

Switch Disconnectors

						
CSSD800K3 CSSD800K4	CSSD1000K3 CSSD1000K4	CSSD1250K3 CSSD1250K4	CSSD1600K3 CSSD1600K4	CSSD1800K3 CSSD1800K4	CSSD2500K3 CSSD2500K4	CSSD3150K3 CSSD3150K4
-	-	CSSD1250K185	CSSD1600K185	-	CSSD2500K185	CSSD3150K185
BASE	BASE	BASE	BASE	BASE	BASE	BASE
800	1000	1250	1600	1800	2500	3150
800	1000	1250	1600	1800	2300	2600
690	690	690	690	690	690	690
1000	1000	1000	1000	1000	1000	1000
12	12	12	12	12	12	12
350kW 24kA	400kW 50kA	400kW 50kA	500kVA¹⁾ 50kA	750kVA¹⁾ 50kA	1000kVA¹⁾ 80kA	1250kVA¹⁾ 80kA
-	CSWPL0052	CSWPL0052	CSWPL0052	-	-	-
CSWPL0153²⁾	-	-	-	-	-	-
CSWPL0154²⁾	-	-	-	-	-	-
CSSDF-ZX33 CSSDF-ZX34	CSSDF-ZX35 CSSDF-ZX36	CSSDF-ZX35 CSSDF-ZX36	CSSDF-ZX35 CSSDF-ZX36	CSSDF-ZX35 CSSDF-ZX36	CSSDF-ZX35 CSSDF-ZX36	CSSDF-ZX35 CSSDF-ZX36
CSWHIP145S12	CSWHIP220S12	CSWHIP220S12	CSWHIP220S12	CSWHIP220S12	CSDA8	CSDA8
CSDB16 HMK-1	CSDB28 HMK-3	CSDB28 HMK-3	CSDB28 HMK-3	CSDB28 HMK-3	-	-
-	-	-	-	-	-	-
CSP-12X465 CSSDZX95	CSP-12X465 CSSDZX95	CSP-12X465 CSSDZX95	CSP-12X465 CSSDZX95	CSP-12X465 CSSDZX95	CSP-12X465 CSSDZX95	CSP-12X465 CSSDZX95
CSSDZW-4 CSSD-ZW11	CSSDZW-4 CSSD-ZW12	CSSDZW-4 CSSD-ZW12	CSSDZW-4 CSSD-ZW12	CSSDZW-4 CSSD-ZW12	CSSDZW-4 CSSD-ZW12	CSSDZW-4 CSSD-ZW12
40 x 5mm 1 x M12 2 x 240mm²	50 x 12mm 2 x M12 2 x 60 x 5mm	50 x 12mm 2 x M12 2 x 80 x 5mm	50 x 16mm 2 x M12 2 x 100 x 5mm	50 x 16mm 2 x M12 2 x 100 x 5mm	2 x 50 x 16mm 4 x M12 4 x 100 x 5mm	2 x 50 x 16mm 4 x M12 3 x 100 x 10mm
260	343	343	461	461	468	468
330	423	423	600	600	607	607
223	372	372	372	372	372	372
130	125	125	125	125	271	271



Enclosed Switches 25-400A

Features:

- Degree of protection IP65.
- 4 x knock-out gland entries top and bottom.
- Tested up to 690V AC.
- Hi visible red/yellow handle.
- Padlocking handle, up to 3 locks.



192335ME

Features:

- Degree of protection IP65.
- High impact strength.
- Includes earth termination.
- Tested up to 690V AC.
- 3 and 4 pole designs available.



ELCLCSD

Features:

- Generous cable space.
- Degree of protection IP65.
- Mild steel enclosure, RAL7032.
- Supplied in 4 pole.



CSSD

ISOLATORS IN POLYCARBONATE ENCLOSURES - 4 POLE

Rating (A)	AC21 (A)	AC23* (kW)	Withstand (kA 1sec)	Poles	Part No.
25	25	11	1.1	4	192315ME
40	40	15	1.1	4	192335ME
63	63	29	1.5	4	192355ME
100	100	46	1.5	4	192375ME

Dimension 25/40A: 101mmW x 140mmH x 115mmD.

Dimension 63/100A: 142mmW x 185mmH x 115mmD.

*Rated Operational Power @ 415V AC.

ISOLATORS IN ALUMINIUM ENCLOSURES - 3 & 4 POLE

Rating (A)	AC21 (A)	AC23 (kW)	Withstand (kA 1sec)	Poles	Part No.
25	25	7.5	0.9	3	ELCLCSD25D3
25	25	7.5	0.9	4	ELCLCSD25D4
40	40	11	1.0	3	ELCLCSD40D3
40	40	11	1.0	4	ELCLCSD40D4
63	63	22	1.0	3	ELCLCSD63K3
100	100	37	1.5	3	ELCLCSD100K3

Dimension 25/40: 110mmW x 130mmH x 114mmD.

Dimension 63/100: 147mmW x 203mmH x 126mmD.

ISOLATORS IN MILD STEEL ENCLOSURES - 4 POLE

Rating (A)	AC21 (A)	AC23 (kW)	Withstand (kA 1sec)	Poles	Part No.
160	160	75	5	4	CSSD160DM4/SE
250	250	132	10	4	CSSD250DM4/SE
400	400	200	20	4	CSSD400K4/SE

Dimension: 400mmW x 500mmH x 200mmD.

Note: Stainless steel available on request.

GE Dilos Load Break Switches 25-315A

Features:

- Complete contact visibility.
- Up to 200A in DIN profile.
- Optional auxiliary contacts.
- Padlocking on switch (63 - 200A).
- Terminal covers.
- Tested to IEC947.3.



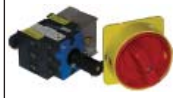

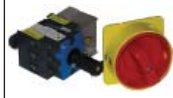
Benefits:

- Operator safety.
- Will fit any standard DIN slot (to 200A).
- Remote indication.
- Safety during maintenance.
- Protection from direct contact.
- Reliability.





Switch Disconnectors

Range						
3 pole switch		789214	789215	789216	789217	789218
4 pole switch		-	-	-	-	-
Neutral add-on block (3P switch + N) ²⁾		789251	789251	789253	789253	789255
Mounting		BASE	BASE	BASE	BASE	BASE
Operation						
Thermal current	Ith (A)	25	40	63	80	125
Enclosed thermal current	Ithe (A)	25	32	50	63	100
Operating voltage	Ue (V)	690	690	690	690	690
Insulation voltage	Ui (V)	690	690	690	690	690
Impulse withstand	Uimp (kV)	6	6	6	6	6
Operational power (415V)	P (W)	11kW	15kW	30kW	37kW	45kW
Short-time withstand (1 sec)	Icw (kA)	300A	480A	765A	960A	1.5kA
Terminal Covers						
Terminal cover 3 pole		1 x included	1 x included	1 x included	1 x included	1 x included
Extra load side terminal cover 3 pole		789272	789272	789273	789273	789274
Terminal covers 4 pole		-	-	-	-	-
Terminal covers 1 pole (Neutral add block)		789270	789271	789271	789271	789271
Auxiliary Contacts						
1 NO + 1 NC		789269	789269	789269	789269	789269
2 NO + 1 NC		-	-	-	-	-
Handles						
Door mounting handle IP65		Included	Included	Included	Included	Included
Direct mount handle		-	-	-	-	-
Key lockable door mount handle (suit ronis)		-	-	-	-	-
Ronis key lock (1104)		-	-	-	-	-
Shafts						
Extension shafts 65		789275	789275	789275	789275	789275
Extension shafts 165		789276	789276	789276	789276	789276
Extension shafts 265		789277	789277	789277	789277	789277
Extension shafts 365		789278	789278	789278	789278	789278
Options						
Rear connection studs 3P		-	-	-	-	-
Rear connection studs 4P		-	-	-	-	-
Dimensions						
Connections	Tag	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel
	Tag bolt size	-	-	-	-	-
	Cable range	1.5 - 10mm²	1.5 - 10mm²	2.5 - 35mm²	2.5 - 35mm²	6 - 70mm²
Outline dimensions	Width 3P (mm)	45	45	53.5	53.5	70
	Width 4P (mm)	54	54	75.5	75.5	92
	Height (mm)	78	78	100	100	100
	Depth (mm)	55	55	72	72	72

1) Pack includes 2 pieces, line and load cover.

2) Add on 4th pole block, purchase 1 x 3P switch + 1 x 4th pole block.

3) Switch only.



Terminal Covers



Auxiliary Contacts







Handles



Shafts

Switch Disconnectors



							
	730986	730990	730055	730073	730096	730469 ³⁾	730472 ³⁾
	-	-	730123	730141	730165	730497 ³⁾	730500 ³⁾
	731006	731014	-	-	-	-	-
	DIN/BASE	DIN/BASE	DIN/BASE	DIN/BASE	DIN/BASE	BASE	BASE
	25	40	63	125	200	250	315
	25	40	63	125	200	250	315
	690	690	690	690	690	690	690
	690	690	690	690	690	690	690
	8	8	8	8	8	8	8
	7.5kW	11kW	28kW	46kW	92kW	140kW	175kW
	1kA	1.2kA	3kA	3kA	3kA	9kA	9kA
	732003	732003	-	-	1 x 4 pole included	-	-
	732003	732003	-	-	-	-	-
	-	-	731024 ¹⁾	731024 ¹⁾	730263	731459	731459
	731002	731002	-	-	-	-	-
	731000	731000	-	-	-	-	-
	-	-	730253	730253	730253	730253	730253
	730996	730996	730256	730256	730256	730661	730661
	Included	Included	Included	Included	Included	730649	730649
	-	-	-	-	-	730663	730663
	-	-	-	-	-	769080	769080
	Incl in handle	Incl in handle	Incl in handle	Incl in handle	Incl in handle	Incl in handle	Incl in handle
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	730629	730629
	-	-	-	-	-	730630	730630
	Tunnel	Tunnel	Tunnel	Tunnel	20 x 20mm	30 x 30mm	30 x 30mm
	-	-	-	-	M8	M8	M8
	1.5 - 16mm ²	1.5 - 16mm ²	6 - 50mm ²	6 - 50mm ²	up to 6 x 20mm	up to 6 x 30mm	up to 6 x 30mm
	36	36	90	90	144	185	185
	49	49	90	90	144	185	185
	74	74	90	90	90	170	170
	70	70	98.5	98.5	98.5	93	93



Enclosed Switches up to 160A

Features:

- Degree of protection IP65.
- High impact strength.
- Easy to machine material.
- Tested up to 690V AC.



LBS1254P/E

ISOLATORS IN POLYESTER ENCLOSURES - 4 POLE

Rating (A)	AC21 (A)	AC23 (kW)	Withstand (kA 1sec)	Poles	Part No.
125	125	46	3.0	4	LBS1254P/E
160	160	75	4.0	4	LBS1604P/E

Dimension: 185mmW x 300mmH x 175mmD.

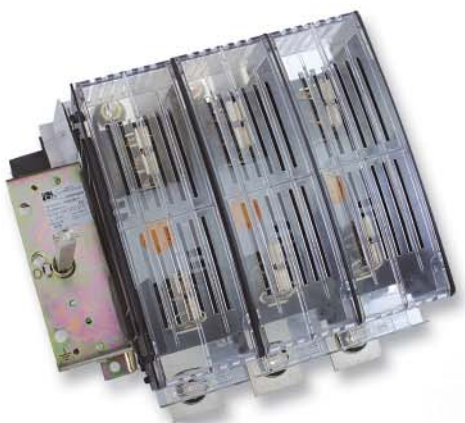
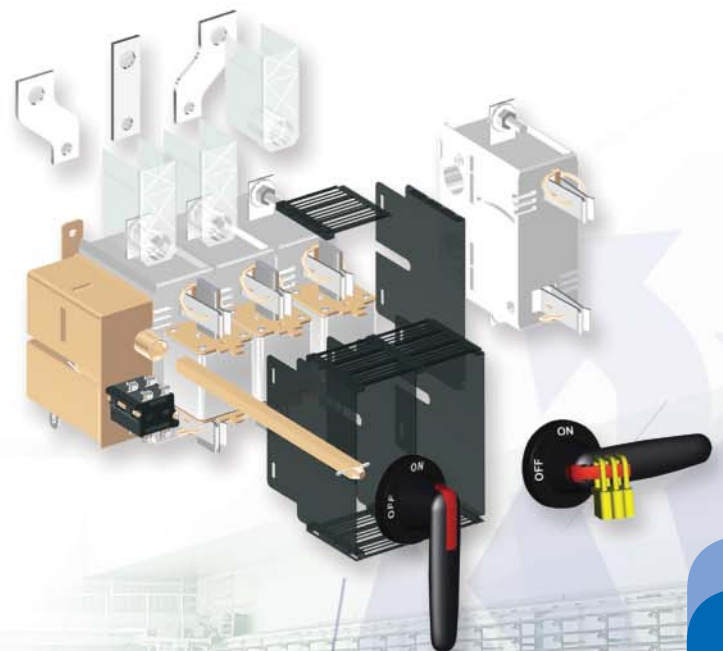
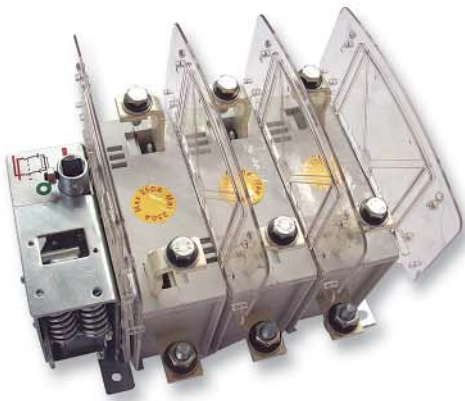
C&S Fuse Switches 63 - 800A

Features:

- BS88 or DIN fuse models available.
- Optional auxiliary contacts.
- Padlocking on switch.
- Terminal covers.
- Tested to IEC947.3.
- Optional fuse covers.

Benefits:

- Flexible fuse link options.
- Remote indication.
- Safety during maintenance.
- Protection from direct contact.
- Reliability.



Fuse Switches



Range

BS switch, surface mount 3P	incl. handle & shaft	CSSDF63B3	CSSDF125B3	CSSDF160B3	CSSDF200B3
DIN switch, surface mount 3P	incl. handle & shaft	CSSDF63D3	CSSDF125D3	CSSDF160D3	CSSDF200D3
	Mounting	BASE	BASE	BASE	BASE

Operation

Thermal current	I _{th} (A)	63	125	160	200
Enclosed thermal current	I _{the} (A)	63	125	160	200
Operating voltage	U _e (V)	415	415	415	415
Insulation voltage	U _i (V)	750	750	750	1000
Impulse withstand	U _{imp} (kV)	12	12	12	12
Operational power (415V)	P (W)	30	55	75	110
	DIN fuse type	NH00	NH00	NH00	NH1
	BS88 fuse Type	A2	A4	B1	B1-B4

Covers

	Fuse cover 1 pole	-	-	-	CSWPL0026
	Fuse covers 3 pole	-	-	CSWPL0020	-
	Terminal covers 1 pole	Not Required	SF702	SF702	CSWPL0043

Auxiliary Contacts

	1 NO + 1 NC	CSSDF-ZX46	CSSDF-ZX1	CSSDF-ZX1	CSSDF-ZX33
	2 NO + 2 NC	CSSDF-ZX32	CSSDF-ZX16	CSSDF-ZX16	CSSDF-ZX34

Handles

	Replacement premium IP65	CSWHIP80S6	CSWHIP80S6	CSWHIP80S6	CSWHIP145S12
	Direct handle kit	-	-	-	HMK-1
	Old handle (pre 2011)	CSDB20	CSDB20	CSDB20	CSDB16

Shafts

	Extension shaft 6 x 340mm	CSP-6x340	CSP-6x340	CSP-6x340	-
	Extension shaft 12 x 465mm	-	-	-	CSP-12x465
	Coupling 12 x 12mm	-	-	-	CSSDZX95

Options

	Changeover mechanism	CSSF-ZW1	CSSF-ZW1	CSSF-ZW1	
	Castell locking kit	CSSDF-ZW15	CSSDF-ZW15	CSSDF-ZW15	CSSDF-ZW15

Dimensions (base unit)

Connections	Tag	Tunnel	20 x 20 x 3mm	20 x 20 x 3mm	25 x 25 x 5mm
	Tag bolt size	-	1 x M8	1 x M8	1 x M10
	Max cable size mm ²	1 x 25mm²	1 x 70mm²	1 x 70mm²	1 x 95mm²
Outline dimensions	Width BS88 (mm)	168	190	212	260
	Width DIN (mm)	168	190	190	260
	Height (mm)	107	142	142	200
	Depth (mm)	136	134	134	185

- 1) Breakout to be removed before fitting.
- 2) Rated operational current AC23B 415V.
- 3) Switch only.



Covers



Auxiliary Contacts



Handles



Shafts




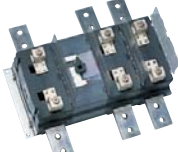


Castell Lock



Fuse Covers

Fuse Switches

					
CSSDF250B3 CSSDF250D3	CSSDF315B3 CSSDF315D3	CSSDF400B3 CSSDF400D3	CSSDF630B3 CSSDF630D3	CSSDF800B3	730827³⁾
BASE	BASE	BASE	BASE	BASE	BASE
250	315	400	630	800	1250
250	315	400	630	800	1250
415	415	415	415	415	690
1000	1000	1000	1000	1000	1000
12	12	12	12	12	8
132	180	200	355	400	1250A²⁾
NH1	NH2	NH2	NH3	-	NH4
B1-B4	B1-B4	B1-B4	C1-C4	C1-C4	D1
CSWPL0026	CSWPL0029	CSWPL0029	-	-	730869
-	-	-	CSWPL0021	CSWPL0021	-
CSWPL0043	CSWPL0043	CSWPL0043	SF704¹⁾	SF704¹⁾	-
CSSDF-ZX33	CSSDF-ZX33	CSSDF-ZX33	CSSDF-ZX35	CSSDF-ZX35	730860
CSSDF-ZX34	CSSDF-ZX34	CSSDF-ZX34	CSSDF-ZX36	CSSDF-ZX36	730861
CSWHIP145S12	CSWHIP145S12	CSWHIP145S12	CSWHIP220S12	CSWHIP220S12	730865
HMK-1	HMK-1	HMK-1	HMK-3	HMK-3	730975
CSDB16	CSDB16	CSDB16	CSDB28	CSDB28	-
-	-	-	-	-	-
CSP-12x465	CSP-12x465	CSP-12x465	CSP-12x465	CSP-12x465	-
CSSDZX95	CSSDZX95	CSSDZX95	CSSDZX95	CSSDZX95	CSSDZX95
CSSDF-ZW4	CSSDF-ZW4	CSSDF-ZW4	CSSDF-ZW4	CSSDF-ZW4	-
					CSSDF-ZW4
25 x 25 x 5mm	25 x 25 x 5mm	25 x 25 x 5mm	50 x 50 x 6mm	50 x 50 x 6mm	60 x 65 x 10mm
1 x M10	1 x M10	1 x M10	1 x M12	1 x M12	2 x M12
1 x 120mm²	1 x 185mm²	1 x 240mm²	2 x 185mm²	2 x 240mm²	2 x 60 x 10mm
260	284	284	403	403	550
260	284	284	343	-	-
200	200	200	320	320	390
185	193	193	223	223	310



Enclosed Fuse Switches 160 - 400A

Features:

- Degree of protection IP65.
- Tested up to 415V AC.
- Available in 3 pole.
- Optional fuse covers.
- Optional terminal covers.
- For BS88 fuse links.



CSSDF

FUSE SWITCHES IN MILD STEEL ENCLOSURES - 3 POLE

Rating (A)	AC21 (A)	AC23 (kW)	Fuse Type	Poles	Part No.
160	160	75	TF160	3	CSSDF160B3/SE
250	250	132	TKF250	3	CSSDF250B3/SE
400	400	200	TMF400	3	CSSDF400B3/SE

Dimension: 400mmW x 500mmH x 250mmD.

Note: Stainless steel versions available on request.

Fuse Switches DIN 160 - 1600A

Features:

- Plug-in onto type tested bus system.
- High degree of segregation.
- Future spaces.
- High short circuit strength.
- IP20 shielding.
- Compact design.
- Clamp on to 60mm busbar systems.
- Removable fuse handle.
- Available in 3 and 4 pole design with NH DIN fuses.





Benefits:

- Fast installation.
- Up to form 4 construction.
- Quick and easy to add new circuits.
- Dependable design.
- Safety during maintenance.
- High filling factor per tier.
- Quick and convenient.
- Increased safety during maintenance.





Fuse Switches

					
Range					
	1 pole	LTL00-1/9	LTL1-1/9	-	LTL3-1/9
	2 pole	LTL00-2/9	LTL1-2/9	-	LTL3-2/9
	3 pole	DIND003S	DIND013S	DIND023S	DIND033S
	4 pole	LTL00-4/9	LTL1-4/9	-	LTL3-4/9
	3 Pole busbar Mounting (60mm)	DIND00BB	DIND01BB	DIND02BB	-
Operation					
Thermal current (with fuses)	Ith (A)	160	250	400	630
Thermal current (with solid links)	Ith (A)	210	325	520	1000
Operating voltage	Ue (V)	690	690	690	690
Insulation voltage	Ui (V)	800	800	800	800
Impulse withstand	Uimp (kV)	8	8	8	8
Rated making capacity	AC22B (A)	480	750	1200	1890
Rated breaking capacity	AC22B (A)	480	750	1200	1890
	DIN fuse type	NH000/00	NH1	NH2	NH3
Terminal Covers					
	Terminal covers 1 pole	GOU-LTL00-1	GOU-LTL1-1	-	GOU-LTL3-1
	Terminal covers 3 pole (Top)	GOU-LTL00-3	GO-LTL1-3	GO-LTL2-3	GO-LTL3-3
	Terminal covers 3 pole (Bottom)	GOU-LTL00-3	GU-LTL1-3	GU-LTL2-3	GU-LTL3-3
	Terminal cover busbar Mounted units (top)	GOV-LTL00-3/230	GOV-LTL1-3	-	GOV-LTL2-3
	Terminal cover busbar Mounted units (bottom)	GOV-LTL00-3/230	GUV-LTL1-3	-	GUV-LTL2-3
Auxiliary Contacts					
	1 x C/O single pole	EV-LTL00-3	EV-LTL123-1	EV-LTL123-1	EV-LTL123-1
	1 x C/O three pole	EV-LTL00-3	EV-LTL123-3	EV-LTL123-3	EV-LTL123-3
Handles / Doors					
	Righthand door	-	-	-	-
	Lefthand door	-	-	-	-
Fuse Monitors					
		ES00-LTL00	ES00-LTL1	ES00-LTL2	ES00LTL-3
Other					
	Terminal clamps	CLAMP00-K	CLAMP1-K	CLAMP2-K	CLAMP3-K
	Earthing handle kit	-	-	-	-
	60mm busbar support	FBB3S	FBB3S	FBB3S	FBB3S
	Busbar support end cover	FBB3E	FBB3E	FBB3E	FBB3E
Dimensions					
Connections	Tag	20 x 20 x 1.5mm	25 x 25 x 2.5mm	30 x 30 x 3mm	40 x 35 x 3mm
	Tag bolt size	M8	M10	M10	M10
	Max cable size	95mm²	150mm²	240mm²	300mm²
Outline dimensions	Width 3 pole	106	184	210	254
	Width 4 pole	155	253	-	345
	Height	220	317	397	430
	Depth	86	119	133	147

1) Height of 4 pole unit is twice the 3 pole value eg: 4P 160A is 100mm.



Terminal Covers



Auxiliary Contacts



Fuse Monitors



Terminal Clamp



FBB3S

Fuse Switches

					
LTL4a-3X/9/1250	LTL4a-3X/9/1600	-	-	-	-
-	-	-	-	-	-
LTL4a-3X3/9/1250	LTL4a-3X3/9/1600	SASDN003N SASDN004N	SASDN013N SASDN014N	SASDN223N SASDN224N	SASDN233N SASDN234N
-	-	-	-	-	-
LTL4a-1X/AO/9/1250	-	-	-	-	-
-	-	-	-	-	-
1250	1600	160	250	400	630
1250	1600	-	-	-	-
690	690	690	690	690	690
800	800	1000	1000	1000	1000
32	52	8	8	8	8
3750	4800	480	750	1200	1890
3750	4800	480	750	1200	1890
NH4a	NH4a	NH000/00	NH1	NH2	NH3
-	-	-	-	-	-
-	-	CP00	CP01	CP23	CP23
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
K/EV-LTL4a	K/EV-LTL4a	Factory Fitted	Factory Fitted	Factory Fitted	Factory Fitted
K/EV-LTL4a	K/EV-LTL4a	Factory Fitted	Factory Fitted	Factory Fitted	Factory Fitted
-	-	SASCOV00N	SASCOV01N	SASCOV02N	SASCOV02N
-	-	SASCOV00LN	SASCOV01LN	SASCOV02LN	SASCOV02LN
ES00-LTL4	ES00-LTL4	Factory Fitted	Factory Fitted	Factory Fitted	Factory Fitted
-	-	-	-	-	-
EE-LTL4a	EE-LTL4a	-	-	-	-
-	-	-	-	-	-
FBB3E	-	-	-	-	-
55 x 50 x 13mm	67 x 50 x 13mm	20 x 20 x 1.5mm	22 x 25 x 4mm	35 x 35 x 5mm	30 x 35 x 6mm
M16	2 X M12	M8	M10	M12	M12
400mm ²	400mm ²	95mm ²	150mm ²	2 x 240mm ²	2 x 240mm ²
312	312	542	542	542	542
-	-	542	542	542	542
350	350	50 ¹⁾	75 ¹⁾	150 ¹⁾	150 ¹⁾
218	218	255	255	255	255



Ministack - Fuse Switch System

Ministack switches feature:

- Removable cassette - high operator safety.
- Busbar tested to 63kA for 1 second.
- Future expansion panels - easy future upgrades.
- Fully shrouded riser busbar system.
- Australian made.
- Proven design.



MIXED STACK



200A CMS



200A CMS



200A CASSETTE



REAR MOULDING

REPLACEMENT MINISTACK SWITCHES - SUIT FREE STANDING STACK SYSTEM

AC21 Current	Door Dimensions W x H	Ref No.	Part No.
100A	259 x 159mm	CMS100	5KB2397-030
200A	259 x 159mm	CMS200	5KB2397-040
400A	483 x 399mm	CMS400	5KB2339-070
630A	483 x 399mm	CMS630	5KB2339-080
800A	483 x 800mm	CMS800	5KB2339-090

REPLACEMENT MINISTACK SWITCHES - SUIT GEC MINIFORM SWITCHBOARD SYSTEM ONLY

100A	227 x 132mm	CM100	5KB1174-030
200A	227 x 132mm	CM200	5KB1174-040
400A	456 x 332mm	CM400	5KB2339-010
630A	456 x 332mm	CM630	5KB2339-020

REPLACEMENT CASSETTES - SUIT CM, CMS

	Fuse Type	Fixing	
100A	TB/TCP	94mm	5KB1045-010
200A	TC/TF	111mm	5KB1045-020
400A	TKM/TM	133/184mm	5KB1214-010
630A	TKM/TTM	133/184mm	5KB1214-020
800A	TTM/TLM	133/184mm	5KB1214-030

REPLACEMENT REAR MOULDINGS FOR LOAD CONNECTIONS

		Vertical Bar Size	
100/200A	600A 50.6x6.3mm	Left Side connection	5KB2772-050
100/200A		Right Side connection	5KB2772-040
100/200A		Rear connections	5KB2772-060
100/200A	900A 'D' Bar 50.6x9.56mm	Left Side connection	5KB2772-020
100/200A		Left Side connections Extended	5KB2772-080
100/200A		Right Side connection	5KB2772-010
100/200A		Right Side connections Extended	5KB2772-070
100/200A		Rear connections	5KB2772-030
400/630A		1000A 50.6x9.56mm	Left Side connection
400/630A	Right Side connection		5KB1230-030
400/630A	Rear connections		5KB1230-040

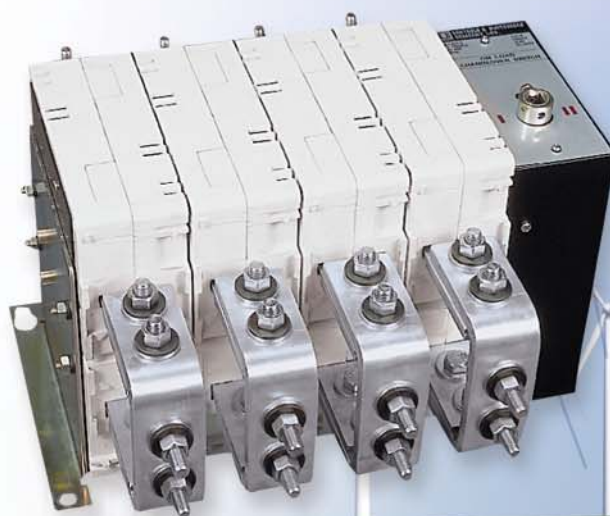
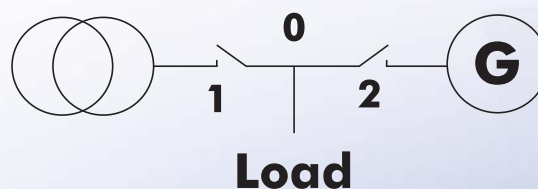
Changeover Switches 63 - 1600A

Features:

- Up to 125A in DIN profile.
- Small foot print.
- Optional auxiliary contacts.
- Terminal covers.
- Tested to IEC947.3.
- IP65 handles.






Benefits:

- Will fit any standard DIN slot (to 125A).
- Space saving.
- Remote indication.
- Protection from direct contact.
- Reliability.
- Suitable for mounting outdoors.



Changeover Switches



Range						
3 pole switch	incl. handle & shaft	192053⁴⁾	192083⁴⁾	-	-	-
4 pole switch	incl. handle & shaft	192353⁴⁾	192383⁴⁾	CSCS100P4COC	CSCS160P4COC	CSCS200P4COC
	Mounting	DIN/BASE	DIN/BASE	BASE	BASE	BASE
Operation						
Thermal current	I _{th} (A)	63	125	100	160	200
Enclosed thermal current	I _{the} (A)	63	125	100	160	200
Operating voltage	U _e (V)	690	690	415	415	415
Insulation voltage	U _i (V)	800	800	1000	1000	1000
Impulse withstand	U _{imp} (kV)	8	8	6	6	6
Operational power (415V)	P (W)	29	37	55	90	90
Short-time withstand (1 sec)	I _{cw} (kA)	1.5	1.5	2	3	3
Covers						
	Terminal covers 1 pole	19427	19427	Included	Included	Included
	Terminal covers 3 pole	19425	19425	-	-	-
Auxiliary Contacts						
	1 x C/O	19429	19429	CSAUXKT1	CSAUXKT1	CSAUXKT1
	2 x C/O lower	-	-	-	-	-
	2 x C/O	-	-	-	-	-
	2 x C/O upper	-	-	-	-	-
Handles						
	Replacement premium IP65	19402	19402	CCOHIP80S6	CCOHIP80S6	CCOHIP80S6
	Old handle (pre 2011)	-	-	-	-	-
Shafts						
	Extension shaft 5 x 5 x 200mm	19535-200	19535-200	-	-	-
	Extension shaft 6 x 6 x 340mm	-	-	CSP-6X340	CSP-6X340	CSP-6X340
	Extension shaft 12 x 12 x 465mm	-	-	-	-	-
	Shaft coupling 12 x 12mm	-	-	-	-	-
Dimensions						
Connections	Tag	Tunnel	Tunnel	20 x 20 x 3mm	27 x 25 x 3.5mm	27 x 25 x 3.5mm
	Tag bolt size	-	-	1 x M8	1 x M10	1 x M10
	Max cable size	16 - 50mm²	35 - 50mm²	1 x 70mm²	1 x 70mm²	1 x 95mm²
Outline dimensions	Width 3 pole	104	104	-	-	-
	Width 4 pole	138	138	201	250	250
	Height	100	100	149	233	233
	Depth	97	97	124	124	124

- 1) Based on calculations IEC 947-3, utilisation category B, infrequent operation AC21 @ 415V.
- 2) Covers top terminals only, no covers available for common bars.
- 3) When used with CSCS160DM4CO or CSCS315DM4CO shaft coupling CSSD-ZX95 is required.
- 4) Fitted with direct mount handle only.



Covers



Auxiliary Contacts



Handles



Shafts

Changeover Switches

						
CSCS160DM4CO	CSCS315DM4CO	CSCS630K4CO	CSCS800K4CO	CSCS1000K4CO	CSCS1250K4CO	CSCS1600K4CO
BASE	BASE	BASE	BASE	BASE	BASE	BASE
160	315	630	800	1000	1250	1600
160	315	630	800	1000	1250	1600
690	690	690	690	690	690	690
1000	1000	1000	1000	1000	1000	1000
6	12	12	12	8	8	8
90	160	315	355	400	500kVA ¹⁾	750kVA ¹⁾
5	8	24	24	50	50	50
SF702 ²⁾	SF703 ²⁾	-	-	-	-	-
-	-	-	-	-	-	-
-	CSCS-ZX2	CSCS-ZX2	CSCS-ZX2	CSCS-ZX2	CSCS-ZX2	CSCS-ZX2
CSCS-ZW3-L	-	-	-	-	-	-
-	CSCS-ZX4	CSCS-ZX4	CSCS-ZX4	CSCS-ZX4	CSCS-ZX4	CSCS-ZX4
CSCS-ZX3-U	-	-	-	-	-	-
CCOHIP145S12	CCOHIP145S12	CCOHIP145S12	CCOHIP145S12	CCOHIP220S12	CCOHIP220S12	CCOHIP220S12
CSDB-25	CSDB-25	CSDB-30	CSDB-30	CSDB-30	CSDB-30	CSDB-30
-	-	-	-	-	-	-
-	-	-	-	-	-	-
CSP-12X465 ³⁾	CSP-12X465 ³⁾	CSP-12X465	CSP-12X465	CSP-12X465	CSP-12X465	CSP-12X465
CSSDZX95	CSSDZX95	CSSDZX95	CSSDZX95	CSSDZX95	CSSDZX95	CSSDZX95
20 x 20 x 3mm	25 x 25 x 4mm	40 x 40 x 5mm	40 x 40 x 5mm	50 x 80 x 12mm	50 x 80 x 12mm	50 x 80 x 16mm
1 x M8	1 x M10	1 x M12	1 x M12	2 x M12	2 x M12	2 x M12
1 x 70mm ²	1 x 185mm ²	2 x 185mm ²	2 x 240mm ²	2 x 60 x 5mm	2 x 80 x 5mm	2 x 100 x 5mm
-	-	-	-	-	-	-
256	310	352	352	436	436	502
142	163	223	223	372	372	372
183	242	262	262	260	260	260



Enclosed C/O Switches 63 - 200A

Features:

- Degree of protection IP65.
- Tested up to 690V AC.
- Optional key locking lid.



193053E

CHANGEOVER SWITCH IN POLYCARBONATE ENCLOSURES - 3 & 4 POLE

Rating (A)	AC21 (A)	AC23 (kW)	Withstand (kA 1 sec)	Poles	Part No.
63	63	29	1.5	3	193053E
63	63	29	1.5	4	192353E
125	125	37	1.5	3	192083E
125	125	37	1.5	4	192383E

Dimension 3P: 146mmW x 238mmH x 111mmD.

Dimension 4P: 200mmW x 238mmH x 111mmD.

Features:

- Degree of protection IP65.
- Powder coated RAL7032.
- Tested up to 415V AC.
- Available in 4 pole only.



CSCS200COCSE

CHANGEOVER SWITCH IN MILD STEEL ENCLOSURES - 4 POLE

Rating (A)	AC21 (A)	Withstand (kA 1 sec)	Poles	Part No.
100	100	2.0	4	CSCS100COCSE
200	200	3.0	4	CSCS200COCSE

Dimension: 400mmW x 500mmH x 200mmD.

Note: Stainless steel versions available on request.

Bypass & C/O Switches up to 630A/1250A

Features:

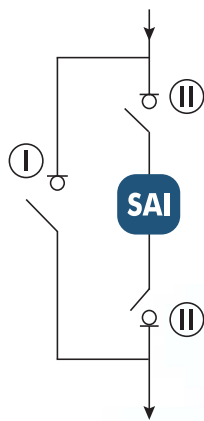
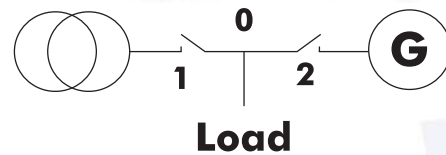
- Overlapping contacts.
- Small foot print.
- Optional motor drive.
- Handle degree of protection IP65.
- Available in 3 and 4 pole designs.

Benefits:

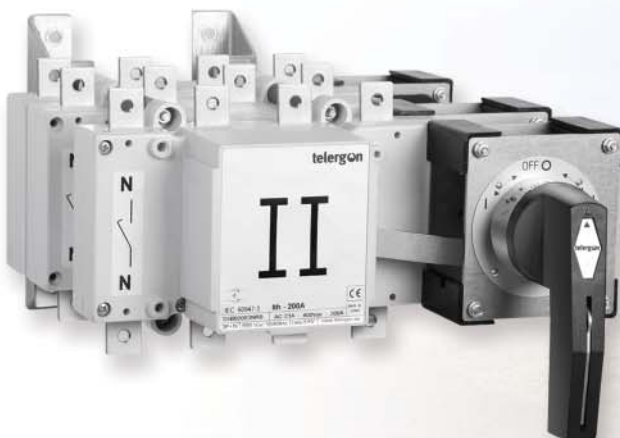
- No break to the load.
- Space saving.
- Remote operation.
- Suitable for harsh environments.



Changeover Switch



Bypass Switch



CHANGEOVER SWITCHES

Bypass Switches



Range

3 pole switch only	S5B02503PRO	S5B03153PRO	S5B04003PRO	S5B05003PRO	S5B06303PRO
4 pole switch only	S5B02503NR0	S5B03153NR0	S5B04003NR0	S5B05003NR0	S5B06303NR0

Operation

Thermal current	I _{th} (A)	250	315	400	500	630
Enclosed thermal current	I _{the} (A)	250	315	400	500	630
Operating voltage	U _e (V)	690	690	690	690	690
Insulation voltage	U _i (V)	1000	1000	1000	1000	1000
Impulse withstand	U _{imp} (kV)	8	8	8	12	12
Operational power (415V)	P (W)	138.5	174.5	221.7	277.1	349.1
Short-time withstand (1 sec)	I _{cw} (kA)	12	12	12	16	16

Covers

Terminal covers	3 pole input 1	DSCU11	DSCU11	DSCU12	DSCU21	DSCU21
Terminal covers	3 pole input 2	DSCU11	DSCU11	DSCU12	DSCU21	DSCU21
Terminal cover	3 pole common output	DSCU11	DSCU11	DSCU12	DSCU21	DSCU21
Terminal covers	4 pole input 1	-	-	-	-	-
Terminal covers	4 pole input 2	-	-	-	-	-
Terminal cover	4 pole common output	-	-	-	-	-

Auxiliary Contacts

1 x C/O	DSAU11	DSAU11	DSAU11	DSAU11	DSAU11
2 x C/O	DSAU12	DSAU12	DSAU12	DSAU12	DSAU12

Handles

Door mounting handle IP65	D5LEN13	D5LEN13	D5LEN13	D5LEN23	D5LEN23
Direct mount handle	DSE112	DSE112	DSE112	DSE122	DSE122
Safety key logic device (single)	DSCS11	DSCS11	DSCS11	D5LCS41	D5LCS41
Safety key logic device (double)	D5LCD12	D5LCD12	D5LCD12	D5LCD41	D5LCD41

Shafts

Extension shaft 173mm	D5LEN13	D5LEN13	D5LEN13	D5LEN23	D5LEN23
Extension shaft 275mm	-	-	-	-	-

Motor Drive

Motor drive	-	-	-	-	-
-------------	---	---	---	---	---

Dimensions

Connections	Tag	25 x 25 x 4mm	25 x 25 x 4mm	25 x 25 x 4mm	25 x 25 x 5mm	30 x 30 x 5mm
	Tag bolt size	M10	M10	M10	M10	M10
	Max cable size	185mm²	185mm²	240mm²	240mm²	2 x185mm²
Outline dimensions	Width 3 pole	298	298	298	373	373
	Width 4 pole	298	298	298	373	373
	Height	190	190	190	280	280
	Depth	292	292	292	375	375



Covers



Auxiliary Contacts



Handles



Shafts



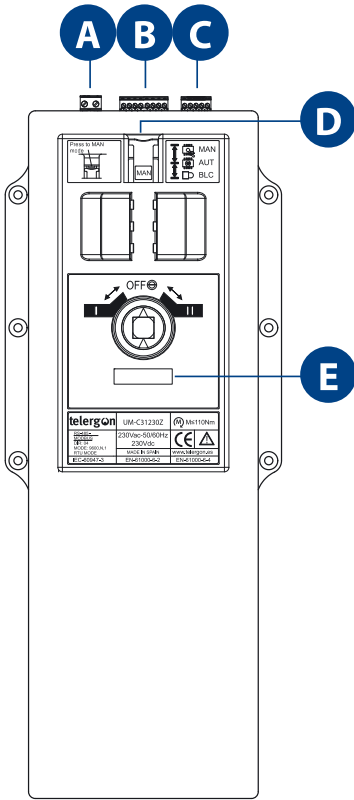
Motor Drive

Changeover Switches



Range		3 pole switch only	CCF04003PS0	CCF08003PS0	CCF12503PS0
		4 pole switch only	CCF04003NS0	CCF08003NS0	CCF12503NS0
Operation					
	Thermal current	Ith (A)	400	800	1250
	Enclosed thermal current	Ithe (A)	400	800	1250
	Operating voltage	Ue (V)	690	690	690
	Insulation voltage	Ui (V)	1000	1000	1000
	Impulse withstand	Uimp (kV)	8	12	12
	Operational power (415V)	P (W)	125	315	626
	Short-time withstand (1 sec)	Icw (kA)	8	13	25
Covers					
	Terminal covers	3 pole input 1	DM2CU12	DM2CU22	DM2CU32
	Terminal covers	3 pole input 2	DM2CU11	DM2CU21	DM2CU31
	Terminal cover	3 pole common output	DCCCU11	DCCCU21	DCCCU31
	Terminal cover	4 pole input 1	DM2CU13	DM2CU23	DM2CU33
	Terminal cover	4 pole input 2	DM2CU13	DM2CU23	DM2CU33
	Terminal cover	4 pole common output	DCCCU12	DCCCU22	DCCCU32
Auxiliary Contacts					
		1 x C/O	D5LAU01	D5LAU01	D5LAU01
		2 x C/O	D5LAU02	D5LAU02	D5LAU02
Handles					
	Door mounting handle	IP65	DCCEN11	DCCEN21	DCCEN31
	Direct mount handle		DCCEN111	DCCEN121	DCCEN131
	Safety key logic device	(single)	DM2CS11	DM2CS21	DM2CS31
	Safety key logic device	(double)	DM2CD11	DM2CD21	DM2CD31
Shafts					
	Extension shaft	173mm	-	-	-
	Extension shaft	275mm	DM2EP11	DM2EP21	DM2EP31
Motor Drive					
	Motor drive		UMC15230Z	UMC25230Z	UMC31230Z
Dimensions					
Connections	Tag		25 x 25 x 3mm	40 x 45 x 5mm	50 x 60 x 6mm
	Tag bolt size		M10	M12	M16
	Max cable size		240mm ²	2 x 240mm ²	2 x 10 x 60mm
Outline dimensions	Width	3 pole	235	321	424
	Width	4 pole	235	321	424
	Height		216	312	419
	Depth		151	180	208

ATS Motor Drive - Product Guide



- A** Voltage supply **MU UM**
- B** Input signals and MODBUS
- C** Output signals
- D** Operation selector
- E** Display

A VOLTAGE SUPPLY

The **MU** requires a voltage supply for its operation **A**. For the **MU** to have an uninterrupted supply system (mains - secondary sources), the customer shall prepare an additional electric circuit.

Supply voltage available, 120 - 230 - 277 Vac/dc.

B INPUT SIGNALS

The electrical inputs indicate to the **MU** the position to move. The digital inputs configuration allow that they can be operated through a non voltage contact (relay, switch) or directly applying a voltage.

RS485/MODBUS COMMUNICATION

Let the total digital control of the **MU** with the input/output management.

C OUTPUT SIGNALS

Indicate the current position of the device. Performed through a contact based on a solid state relay.

The outputs **C** can be supply through the **MU** internal auxiliary voltage 5Vdc or 24Vdc as outputs common and the corresponding terminal.

The outputs can also be controlled through an external voltage source located between the position outputs and the GND terminal ($V_{max} = 315 \text{ Vac/dc}$, $I_{max} = 120 \text{ mA}$).

D OPERATION SELECTOR

It allows to select the way of operation of the **MU**. MAN Operation only with the manual handle, electric operation not passible.

AUT Motorised operation with inputs/outputs or RS485 MODBUS.

BLC Lock position, manual and motorised operation not possible.

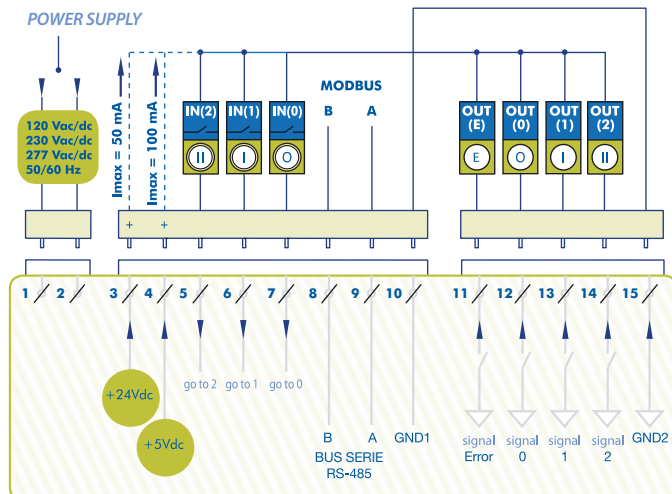
E DISPLAY

4 digits red display is added **E**.

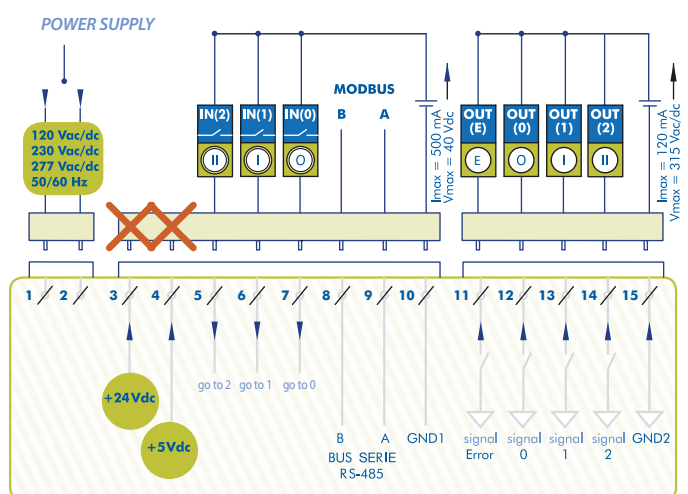
The display shows every moment the operation mode and the device position.

Besides, it is possible to configure the way the messages appear in the display, to adapt it to a **MU** with the motor up or down.

Inputs - Outputs supply by a internal signal 5 or 24Vdc



Inputs - Outputs supply by a external signal



CEFEM Mining Switches 40 - 800A

Features:

- Visible contact windows in each pole.
- Side operation handle.
- Optional metal handle.
- Optional auxiliary contacts.
- Terminal covers.
- Tested to IEC 947.3.
- Up to 1000V AC operating voltage.
- Robust enclosure system.

Benefits:

- Operator safety.
- Improved view of contacts.
- Robust design.
- Remote indication.
- Protection from direct contact.
- Reliability.
- Heavy mining application.
- Easy to install.





CEFEM SAFEBLOC Switches

Features:

- Tested to IEC947.3 for motor switching AC23.
- Visible contacts on each pole.
- Side operation handle.
- External wall fixing with "Easy Fit".
- Integrated rain hood.
- 180 degree opening stainless steel hinges.
- 6mm triplex glass window.
- Optional enclosure materials available.

Options:

- Interlocked door open and closed position.
- Auxiliary contacts for position indication.
- Additional mechanical position indicators.
- Wide range door lock options.
- Sun shade roof / high dust environments.
- Auxiliary control buttons.
- Plastic or metal direct mount or external handles.
- Brass, polyester and metal gland plate options.



- Fully welded 2mm powder coated sheet steel.
- Current ratings up to 800A.
- Voltage rating up to 1000V AC.



- Stainless steel, available in 304 or 316.
- Current ratings up to 800A.
- Voltage rating up to 1000V AC.

- Polyester, for harsh environments.
- Current ratings up to 800A.
- Voltage rating up to 1000V AC.

Enclosed Switchgear - Light Duty

Enclosed Switches (Polyester)

- High impact strength.
- Tested to IEC947.3.
- Motor switching AC23.
- Up to 160A.
- IP65 degree of protection.
- Padlockable handle.
- Easy to machine base.
- Optional auxiliary contacts.
- Optional external mounting.



IPW 20 - 63A (Polycarbonate)

- IP66 protection.
- 4 x M25 entries.
- 1P, 3P and 4P models.
- AS3133 / IEC947.3.
- Padlockable handle.
- Earth & neutral terminals.

Enclosed Cam Switches

- IP65 Enclosure.
- Up to 500V AC.
- C/O & Reversing switches.
- Tested to IEC947.3.
- 1 x M32 + 2 x M25 entries.
- IP20 terminals.
- Polycarbonate enclosure.



Enclosed Switches (Polycarbonate)

- Motor switching AC23.
- Up to 100A.
- Optional auxiliary contacts.
- M20/25 conduit entries.
- Hi visible red yellow handle.

Enclosed C/O Switch (polycarbonate)

- IP65 degree of protection.
- 3P and 4P designs.
- Up to 125A.
- Optional key lock door.
- Position indication.
- Ample conduit entries, top, bottom & side.
- IP20 terminals.



W66 20 - 63A (Polycarbonate)

- IP66 degree of protection.
- 1 & 3 pole designs.
- 1 x M32 + 2 x M25 entries.
- Tested AS3133 / IEC947.3.
- IP20 terminals.
- Padlockable handle.





Industrial Enclosed Switchgear

Enclosed Switches (Aluminium)

- Tested to IEC947.3.
- Motor switching AC23.
- Up to 100A.
- IP65 degree of protection.
- 4 x M25 conduit entries 25 & 40A.
- 4 x M32 conduit entries 63 & 100A.
- Padlockable handle.
- Interlocked door.
- IP20 terminals.

Mining Boxes

- Tested to IEC947.3.
- Motor switching AC23.
- Up to 800A.
- Visible contacts.
- Side operation handle.
- External wall fixing with "Easy Fit".
- Intergrated rain hood.
- 180 degree hinges.
- Circuit identification label.
- Warning danger label.
- Ample termination space.
- Available in mild steel, polyester or stainless steel.



SS Switches (316 Stainless Steel)

- Tested to IEC947.3.
- Motor switching AC23.
- Up to 63A.
- Optional auxiliary contacts.
- Available in 3 & 4 pole models.
- Handle accepts up to 3 padlocks.
- Degree of protection IP66.
- Lid cannot be removed when ON.
- IP20 terminals.
- Ideal for food industry.



Enclosed Switches (mild steel)

- Tested to IEC947.3.
- Motor switching AC23.
- Up to 400A.
- IP65 degree of protection.
- Removable gland plate.
- Optional auxiliary contacts.
- Standard 4 pole switch.
- Padlockable handle.
- Ample termination space.

Industrial Enclosed Switchgear

Enclosed Fuse Switch (mild steel)

- Tested to IEC947.3.
- Motor switching AC23.
- Up to 400A.
- BS88 fuse links.
- Optional fuse covers.
- Optional terminal covers.
- Intergrated gland plate.
- Padlockable handle.
- Reversible door for top entry.
- Ample termination space.



SS Control Station (316 Stainless Steel)

- 1 x or 2 x 22mm holes.
- Degree of protection IP66.
- Suitable for GE P9 or IDEC control devices.
- 2 x M20 entries.
- 4 x M6 mounting holes.
- Ideal for food industry.



Enclosed C/O Switch (mild steel)

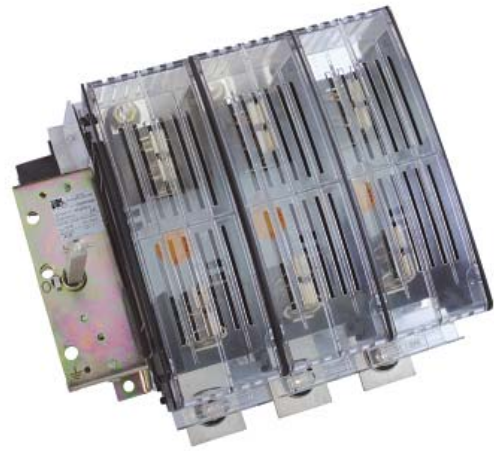
- Tested to IEC947.3.
- Up to 200A.
- Intergrated terminal covers.
- Optional auxiliary contacts.
- Removable gland plate.
- Padlockable handle.
- Reversible door for top entry.
- Ample termination space.





Switch Guide

This is a guide to help in the understanding of switch designs, definitions and testing requirements in accordance with IEC standard 947.3. IEC 947.3 covers the type testing requirements for load break switches, fuse switches and changeover switches in use today.



DEFINITIONS - SWITCHES

Switch

A mechanical switching device capable of making, carrying and breaking currents under normal circuit conditions which may include specified operating conditions and also carrying for a specified time currents under specified abnormal conditions such as those of a short circuit.

Disconnecter

A mechanical switching device which, in the open position, complies with the requirements specified for the isolating function.

Switch-disconnector

A switch which, in the open position, satisfies the isolating requirements specified for a disconnector.

Fuse-combination unit (Fuse switch)

A combination of a mechanical switching device one or more fuses in a composite unit, assembled by the manufacturer or in accordance with the instructions.

Switch-fuse

A switch in which one or more poles have a fuse in series in a composite unit.

Disconnecter-fuse

A disconnector in which one or more have a fuse in series in a composite unit.

Switch-disconnector-fuse

A switch-disconnector in which one or more poles have a fuse in series in a composite unit.

Fuse-switch

A switch in which a fuse link or fuse carrier with fuse-link forms the moving contact.

Fuse-disconnector

A disconnector in which a fuse-link or fuse carrier with fuse-link forms the moving contact.

Fuse-switch-disconnector

A switch-disconnector in which a fuse-link or a fuse-carrier with fuse-link forms the moving contacts.

DEFINITIONS - CHARACTERISTICS

Conventional enclosed thermal current (I_{the})

The conventional enclosed thermal current is the value of current stated by the manufacturer to be used for the temperature-rise tests of the equipment when mounted in a specified enclosure. The value of the conventional enclosed thermal current shall be at least equal to the maximum value of the rated operational current of the enclosed equipment in eight-hour duty.

If the equipment is normally intended for use in unspecified enclosures, the test is not mandatory if the test for conventional free air thermal current has been made. In this case, the manufacturer shall be prepared to give guidance on the value of enclosed thermal current or the derating factor.

Conventional free air thermal (I_{th})

The conventional free air thermal current is the maximum value of test current to be used for temperature-rise tests of unenclosed equipment in free air.

The value of the conventional free air thermal current shall be at least equal to the maximum value of the rated operational current of the unenclosed equipment in eight-hour duty. Free air is understood to be air under normal indoor conditions reasonably free from draughts and external radiation.

Frequency rated (U_{imp})

The supply frequency for which an equipment is designed and to which the other characteristic values correspond.

Rated impulse withstand voltage (U_i)

The peak value of an impulse voltage of prescribed form and polarity which the equipment is capable of withstanding without failure under specified conditions of test and to which the values of the clearances are referred.

The rated impulse withstand voltage of an equipment shall be equal to or higher than the values stated for the transient overvoltage occurring in the circuit in which the equipment is fitted.

Rated insulation voltage

The rated insulation voltage of an equipment is the value of voltage to which dielectric tests and creepage distances are referred. In no case shall the maximum value of the rated operational voltage exceed that of the rated insulation voltage.

Switch Guide

DEFINITIONS - CHARACTERISTICS (CONT.)

Rated operational current (I_e) or rated operational power

A rated operational current of an equipment is stated by the manufacturer and takes into account the rated operational voltage, the rated frequency, the rated duty, the utilisation category and the type of protective enclosure, if appropriate.

In the case of equipment for direct switching of individual motors, the indication of a rated operational current may be replaced or supplemented by an indication of the maximum rated power output, at the rated operational voltage considered of the motor for which the equipment is intended. The manufacturer shall be prepared to state the relationship assumed between the operational current and the operational power, if any.

Rated operational voltage (U_e)

A rated operational voltage of an equipment is a value of voltage which, combined with a rated operational current, determines the application of the equipment and to which the relevant tests and the utilisation categories are referred.

For single-pole equipment, the rated operational voltage is generally stated as the voltage across the pole. For multiple equipment, it is generally stated as the voltage between phases.

Rated short-circuit making capacity (I_{cm})

The rated short-circuit making capacity of a switch or a switch-disconnector is the value of short-circuit making capacity assigned to the equipment by the manufacturer for the rated operational voltage, at rated frequency (if any) and at specified power-factor A (or time-constant). It is expressed as the maximum prospective peak current.

Rated short-time withstand current (I_{cw})

The rated short-time withstand current of a switch, a disconnector or a switch-disconnector is the value of short-time withstand current, assigned by the manufacturer, that the equipment can carry without any damage under the relevant test conditions. The value of the rated short-time withstand current shall be not less than twelve times the maximum rated operational current and unless otherwise stated by the manufacturer, the duration of the current shall be 1s.

Rated uninterrupted current (I_u)

The rated uninterrupted current of an equipment is a value of current, stated by the manufacturer, which the equipment can carry in uninterrupted duty.

Rated conditional short-circuit current

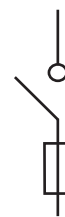
The rated conditional short-circuit current of an equipment is the value of prospective current, stated by the manufacturer, which the equipment, protected by a short-circuit protective device specified by the manufacturer, can withstand satisfactorily for the operating time of this device under the specified test conditions. The details of the specified short-circuit protective device shall be stated by the manufacturer.

MAKING AND BREAKING CURRENT

switch



switch - fuse



fuse - switch



ISOLATING

disconnecter



disconnecter - fuse



fuse - disconnecter



MAKING, BREAKING AND ISOLATING

switch - disconnecter



switch - disconnecter - fuse



fuse - switch - disconnecter



Switch Guide



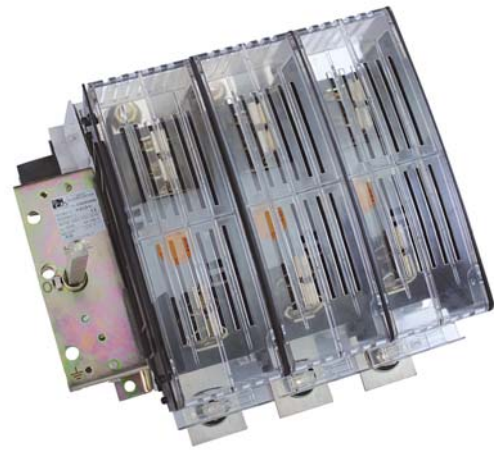
APPLICATION

Load break switches are used in a wide variety of applications from main isolators on incoming switchboards to field motor isolators which can be hundreds of metres away from the control panel that supply it. They can then be called into play at any time and are required to safely switch high currents in emergency situations.

Switch fuse units also play an important role today in protecting networks from short circuit currents and provide the switch capabilities of load break switches in the one unit. Switch fuse units provide the user with a cost effective solution for the protection of distribution networks as well as offering a reliable alternative to circuit breakers.

Changeover switches form an integral part of power supply networks today. Emergency or secondary power supplies are almost mandatory today to optimise production capabilities and investments in business. Changeover switches are used to switch manually between normal and back-up power supplies during maintenance or in the case of a power outage.

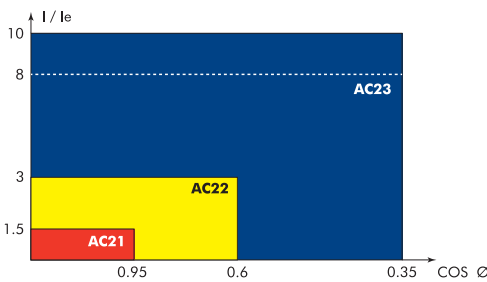
In all cases load break switches need to be reliable and tested for compliance to the latest standards. IPD has ensured all the switches it sells and promotes comply with International electrotechnical commissions standard 947.3.



1) Utilisation category AC

The utilisation category of a switch is its ability to switch **overload** and **short circuit** currents without damage to the contacts. Switches are used in a wide variety of applications and the loads connected can vary from resistive to highly inductive, depending on the installation.

This graphic representation shows the loading applied to switches during type testing for each category. It can be seen that AC23 is by far the most difficult rating for a switch to achieve. This is due to a lagging power factor and its requirement to make 10 times and break 8 times the rated current.



AC21 - make 1.5x break 1.5x (resistive loads)

AC22 - make 3x break 3x (resistive & inductive)

AC23 - make 10x break 8x (inductive loads, **motors**)

2) Utilisation category DC

The utilisation category for switching DC loads is slightly different to the AC requirements as DC does not have a zero crossing point. One needs to be mindful when selecting a switch for a DC network, especially at the higher voltages because of the nature of DC and its ability to draw an arc when switching.

Instead of the phase angle of a circuit adding to the difficulty in switching it is a combination of inductance and resistance or time constant which increases the degree of difficulty. In the table to the right you can see for DC23 (DC motor switching) the time constant is 15ms Vs 1ms for DC21 or resistive loads.

Along with a requirement of 4 times rated current, switching DC loads can be very arduous on switchgear.

The use of DC switches today is on the increase due mainly to the surge in demand for photovoltaic systems. This rise is a result of increased electricity charges and a move to a carbon trading scheme.

Category	Making		Breaking		Cycles (no.)
	I/le	L/R (ms)	I/le	L/R (ms)	
DC21	1.5	1	1.5	1	5
DC22	4	2.5	4	2.5	5
DC23	4	15	4	15	5

Switch Guide

3) Switching capability

When sizing up a main switch on a motor control centre there are two main determining factors; thermal current rating which is straight forward and the isolators breaking capability. Motor control centre load currents are typically extremely inductive and to isolate these inductive loads is quite arduous for all switchgear.

The main switch or isolator on a motor control centre will typically be called into play either for an emergency isolation situation or as an isolation point for maintenance. If a motor in a motor control centre has a locked rotor and the main switch is called in to isolate the fault, the switch will need to break this high short circuit current. However, as the main isolator on an MCC can be quite large it is not necessary to rate this switch as a total of all the motors down stream.

Main switches on MCC's typically have a high thermal capacity in the order of 2,000 – 3,150A on large MCC switchboards. It is a general rule that so long as the main switch on a motor control centre is capable of breaking the locked rotor current of the largest motor installed, then correct thermal current rating and short circuit capacity are the only other factors to consider during the selection process.



4) Operator safety

Operator safety is of prime importance in today's business environment, to help reduce the possibility of an electric shock. Manufacturers are now including visible windows above the switch contacts. These windows provide the operator with an additional check to ensure each pole has broken before commencing work. It should be noted this visual check is in addition to the normal voltage testing / checking procedure which would be carried out on a circuit before commencing work. The GE DILOS range of load break switches from 63A up to 630A provides the operator with clear visible indication of switch contact position from the front. The switch range has a full clear front cover and contact movement which can be easily seen to ensure all poles are broken when switching off.

The DILOS 200A switches are ideally suited for distribution board main switch use as they include padlocking, a direct mount handle, DIN rail mounting and a DIN slot profile for easy installation. Along with their visible contacts it can provide all personnel with a clear indication of switch position.

The DILOS 250 – 630A lend themselves for use as local control units where again visible switch position is required as part of the site's operation procedures. Here, when mounting in an enclosure with a viewing window, operators have the added confidence of checking each pole of the switch has broken.



DILOS 200A

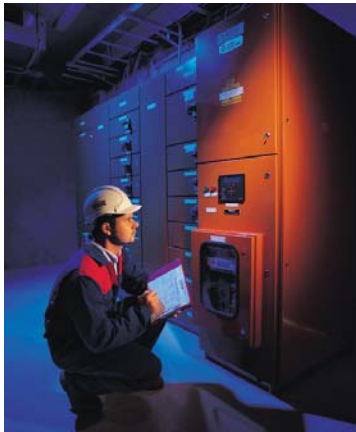
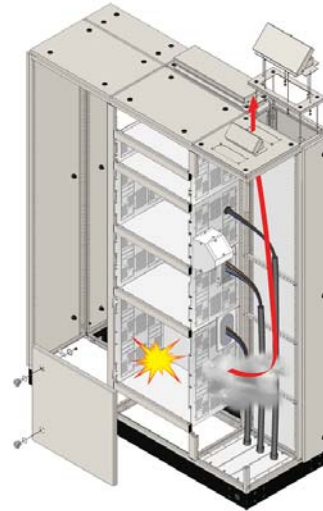


Switch Guide

5) Temperature rise

In Australia, operating temperature can create onerous conditions for switchgear to operate in. Often overlooked but of extreme importance, are the thermal stresses placed on switchgear due to cyclic loading, i.e. thermal current with varying loads over a 24 hour period. Customers should consider carefully the continual cyclic thermal stress on bolted connections and contacts of switchgear. They should also bear in mind the temperature rise of equipment as higher load currents are handled by smaller and more compact switchgear.

IPD, along with its switchboard partner Elsteel, have carried out many thermal as well as short circuit tests on switchgear as part of their ongoing test program for the Techno Switchboard System. Recently a Techno switchboard was tested with GE FULOS fuse switches for arc fault containment @ 690V. In each case, the switches were subjected to an arc fault on the load side connections in a contained chamber with the switch clearing the fault and the switchboard cell contained the resultant arc from escaping and injuring the operator.



6) Electrical and mechanical endurance

Under the requirements of IEC 947.3 the standard provides the minimum number of electrical and mechanical switching operating cycles the switch must perform. This is linked to the switch's possible service conditions and anticipated use it could be subjected to during its life. IEC 947.3 also provides the possibility of two switching categories:

1. Category A: Frequent operations close to a load (safety switch)
2. Category B: Infrequent operations (typical main switch application)

It should be noted that after the electrical and mechanical testing, the switch is tested for leakage current and temperature to ensure the original characteristics are still maintained.

Operational Current I_e	No. operating cycles / hour	Number of operating cycles					
		AC and DC "A" category			AC and DC "B" category		
		Without Current	With Current	Total	Without Current	With Current	Total
$0 < I_e < 100$	120	8,500	1,500	10,000	1,700	300	2,000
$100 < I_e < 315$	120	7,000	1,000	8,000	1,400	200	1,600
$315 < I_e < 630$	60	4,000	1,000	5,000	800	200	1,000
$630 < I_e < 2,500$	20	2,500	500	3,000	500	100	600
$2,500 < I_e$	10	1,500	500	2,000	300	100	400

Switch Guide

MOTOR CURRENTS

MOTOR FULL LOAD CURRENTS	kW	HP	220V A	380V A	415V A	500V A	690V A	1000V A
	0.37	0.5	1.8	1.03	1	1	0.6	0.4
	0.55	0.75	2.75	1.6	1.5	1.2	0.9	0.6
	0.75	1	3.5	2	2	1.5	1.1	0.75
	1.1	1.5	4.4	2.6	2.5	2	1.5	1
	1.5	2	6.1	3.5	3.5	2.6	2	1.3
	2.2	3	8.7	5	5	3.8	2.8	1.9
	3	4	11.5	6.6	6.5	5	3.8	2.5
	3.7	5	13.5	7.7	7.5	5.9	4.4	3
	4	5.5	14.5	8.5	8.4	6.5	4.9	3.3
	5.5	7.5	20	11.5	11	9	6.6	4.5
	7.5	10	27	15.5	14	12	8.9	6
	9	12	32	18.5	17	13.9	10.6	7
	10	13.5	35	20	-	15	11.5	7.5
	11	15	39	22	21	18.4	14	9
	15	20	52	30	28	23	17.3	12
	18.5	25	64	37	35	28.5	21.3	14.5
	22	30	75	44	40	33	25.4	17
	25	35	85	52	47	39.4	30.3	20
	30	40	103	60	55	45	34.6	23
	33	45	113	68	60	50	39	25
	37	50	126	72	66	55	42	28
	40	54	134	79	71	60	44	30
	45	60	150	85	80	65	49	33
	51	70	170	98	90	75	57	38
	55	75	182	105	100	80	61	40
	59	80	195	112	105	85	66	43
	63	85	203	117	115	89	69	45
	75	100	240	138	135	105	82	53
	80	110	260	147	138	112	6	57
	90	125	295	170	165	129	98	65
	100	136	325	188	182	143	107	71
	110	150	356	205	200	156	118	78
	129	175	420	242	230	184	135	85
	132	180	425	245	240	187	140	90
	140	190	450	260	250	200	145	95
	147	200	472	273	260	207	152	100
	150	205	483	280	270	210	159	102
	160	220	520	300	280	220	170	115
	180	245	578	333	320	254	190	135
	185	250	595	342	325	263	200	138
	200	270	626	370	340	281	215	150
	220	300	700	408	385	310	235	160
	250	340	800	460	425	360	274	200
	257	350	826	475	450	365	280	203
	280	380	900	510	475	400	305	220
	295	400	948	546	500	416	320	227
	300	410	980	565	510	420	325	230
	315	430	990	584	535	445	337	239
	335	450	1100	620	550	472	355	250
	355	480	1150	636	580	500	370	262
	375	500	1180	670	610	527	395	273
	400	545	1250	710	650	540	410	288
	425	580	-	760	690	574	445	302
	445	600	-	790	730	595	455	317
	450	610	-	800	740	608	460	320
	475	645	-	850	780	645	485	335
	500	680	-	900	820	680	515	350

This data is a guide only and is based upon normal conditions and average efficiencies and power factors.

The values correspond to 4 pole 50 Hz squirrel cage induction motors.

Values may vary between motor manufacturers.

Switch Guide



TYPE II COORDINATION USING GE FUSES

LV DOL "CL and CK" Starters protected by **GE BS88-2 fuse-links** for short circuit current up to **80kA @ 415V – 50/60 Hz**.
Co-ordination type "2" according to IEC60947-4-1 and EN60947-4-1.

Normal starting: AC3 Cat: max operating cycles per hour =30 on load factor ≤ 60% max temperature inside board 55°C.

Power 415V	Current 415V	Fuse Switch	Fuse-link gG	Fuse-link gM	Contactor	Overload	Range	Cable
0.25	0.7	CSSDF32B3	NIT4	-	CL00	RT1F	0.65-1.1	1
0.37	1.1	CSSDF32B3	NIT6	-	CL00	RT1G	1-1.15	1
0.55	1.5	CSSDF32B3	NIT6	-	CL00	RT1H	1.3-1.9	1
0.75	2	CSSDF32B3	NIT10	-	CL00	RT1J	1.8-2.7	1
1.1	2	CSSDF32B3	NIT10	-	CL00	RT1J	1.8-2.7	1
1.5	3.4	CSSDF32B3	NIT16	-	CL00	RT1K	2.5-4.1	1
2.2	4.5	CSSDF32B3	NIT16	-	CL00	RT1L	4.0-6.3	1
3	6.5	CSSDF32B3	NIT20	-	CL00	RT1M	5.5-8.5	1
4	8	CSSDF63B3	TIA25	NIT20M25	CL00	RT1N	8.0-12	1.5
5.5	11	CSSDF63B3	TIS35	TIA32M35	CL01	RT1P	10-16	1.5
7.5	14	CSSDF63B3	TIS40	TIA32M40	CL02	RT1S	14.5-18	1.5
11	21	CSSDF63B3	TIS50	TIA32M50	CL02	RT1U	21-26	2.5
15	28	CSSDF125B3	TCP80	TIS63M80*	CL25	RT1V	25-32	4
18.5	35	CSSDF125B3	TCP80	TIS63M80*	CL04	RT1W	30-40	6
22	40	CSSDF125B3	TCP80	TIS63M80*	CL45	RT2E	30-43	10
22	40	CSSDF125B3	TCP80	TIS63M80*	CL06	RT2E	30-43	10
30	55	CSSDF125B3	TFP125	TCP100M125	CL07	RT2H	54-65	10
37	68	CSSDF125B3	TFP125	TCP100M125	CL07	RT2J	64-82	16
45	80	CSSDF125B3	TFP160	TCP100M125	CL08	RT2L	78-97	25
50	88	CSSDF125B3	TFP160	TCP100M160	CL09	RT2L	78-97	25
55	100	CSSDF125B3	TFP160	TCP100M160	CL010	RT2M	90-110	35
75	135	CSSDF200B3	TKF250	TF200M250	CK75C	RT3E	110-140	50
100	182	CSSDF250B3	TKF315	TF200M315	CK08C	RT3F	140-190	70
110	200	CSSD250B3	TKF315	TF200M315	CK85B	RT4P	175-280	95
132	240	CSSDF315B3	TKF315	TF200M315	CK09B	RT4P	175-280	120
160	350	CSSD400B3	TMF355	TKF315M355	CK95B	RT4R	200-310	150
200	350	CSSDF630B3	TM400	-	CK10C	RT5C	250-400	185
220	385	CSSDF630B3	TTM450	TM400M450	CK10C	RT5D	315-500	240
250	437	CSSDF630B3	TTM500	-	CK11C	RT5D	315-500	2 x 95
300	508	CSSDF630B3	TTM560	-	CK11C	RT5E	430-700	2 x 120
315	530	CSSDF630B3	TTM560	-	CK11C	RT5E	430-700	2 x 120
335	565	CSSDF800B3	TTM630	-	CK12B	RT5E	430-700	2 x 150
375	627	CSSDF800B3	TTM670	TTM630M670	CK12B	RT5E	430-700	2 x 185

* use AA adaptors to fit into C&S Switches.

Notes:

- 1) Currents are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 times rated current for ≤ 1 sec (normal starting) or ≤ 5 sec (heavy starting).
- 2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides, the user must consider the voltage drop, how the cables are laid and ambient temperature.
- 3) With O/L relay for separate mounting.

Switch Guide

TRANSFORMER RATINGS

Supply Source – The table below provides the prospective short-circuit current available at the terminals of a step down transformer. The values given ignore any impedance in the high voltage supply to the transformer. The nett effect of including high voltage impedance will be reduced prospective short-circuit current.

Transformer Capacity (kVA)	Full Load Current Rating (A)	Short Circuit Current (kA)						
		Transformer Impedance						
		3%	3.5%	4%	4.5%	5%	5.5%	6%
150	209	6.97	5.97	5.23	4.64	4.18	3.80	3.48
200	278	9.27	7.94	6.95	6.18	5.56	5.06	4.63
250	348	11.60	9.94	8.70	7.73	6.96	6.38	5.80
300	417	13.90	11.91	10.43	9.27	8.34	7.58	6.95
400	556	18.53	15.89	13.90	12.36	11.12	10.11	9.27
500	696	23.20	19.89	17.40	15.47	13.92	12.66	11.60
750	1043	34.77	29.8	26.08	23.8	20.86	18.96	17.38
1000	1391	46.37	39.74	34.78	30.91	27.82	25.29	23.18
1500	2087	69.57	59.63	52.18	46.38	41.72	37.95	34.78
2000	2782	92.70	79.49	69.55	61.82	55.64	50.58	46.37

Notes:

1. Figures based on 415V output voltage.
2. For 433V values multiply by 0.96.
3. If transformers connected in parallel add secondary short-circuit currents.

ENCLOSED SWITCHGEAR

Switchgear today is subjected to quite challenging environments. From the harsh UV rays of the Australian sun to the fine dust particles of the outback. Switchgear needs to continue to perform and provide a reliable connection in the network.

Stainless Steel

The resistance of stainless steel to corrosion and staining, low maintenance and relatively low cost makes it an ideal material for many applications.

Powder Coat Mild Steel

Mild steel is the most common form of steel because its price is relatively low whilst it provides material properties that are acceptable for many applications. When powder coated electrostatically and cured under heat, a corrosion resistant "skin" is formed. The skin is UV resistant for between 5-10 years.

Polycarbonate

Unlike most thermoplastics, polycarbonate can undergo large plastic deformations without cracking or breaking. It has high impact-resistance but has low scratch-resistance. When UV stabilised, it can be used outdoors for a variety of insulated enclosures with good durability.

Reinforced Polyester

High impact resistant and easy to machine makes reinforced polyester a perfect material for housing switchgear. When coated with a gel coat it can provide long lasting resistance to UV when installed outdoors.

Powder Coat Aluminium

Aluminium provides a light weight alternative to mild steel enclosures. When powder coated with a polyester finish, it provides a good resistance to most common chemicals.



National Customer Support Centre

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