



 **FEDERAL®**

“All Over the World”

www.federal.com.tr



ASTA



ISO 9001:2008 REGISTERED COMPANY

Low Voltage Protection, Control and Measurement Devices

3.250 KINDS OF LOW-VOLTAGE PRODUCTS AT “FEDERAL”

Established in Sakarya-Turkey, Federal Elektrik has become one of the world's leader Low-Voltage Switchgear Equipment manufacturer. 3250 kinds of products is being manufactured at the factory. It has carried out the production within the frame of globally approved ISO 9001:2008 quality management system that, also has confirmed the quality of its products through AQA, ASTA, TSE and GOST certificates.

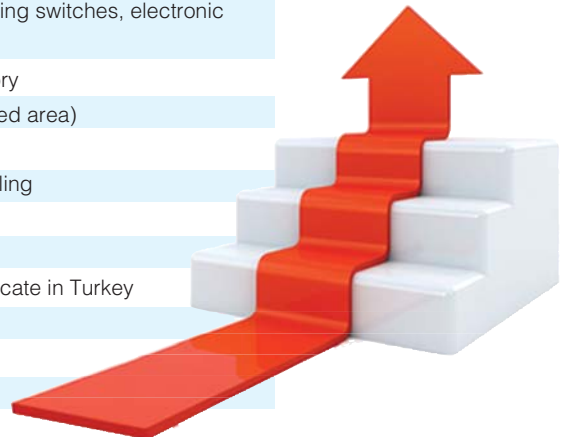


ASTA



HISTORY












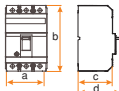
- 2013 The product range reached to 3.250 type of Low Voltage switchgear equipment
- 2009 Production of Natural Gas Meter
- 2008 Is was accepted as well-known brand in the world
- 2007 Total Number of Labor Force is reached to 1100 employees
- 2006 The L.V. Electro-mechanical switchgear equipment series are completed by Federal R&D team
- 2005 Federal Group decided to diversify business. Investment in Lightening switches, electronic ballast, agricultural automation
- 2002 Establishment of Internationally Accredited L.V. Type Test Laboratory
- 1999 Established Factory at 1. Industrial Zone . (25.000 + 7.500 m Closed area)
- 1998 Established Marble Factory (www.federalmermer.com.tr)
- 1996 Started to use Unigraphics Application Software for 3D solid modeling
- 1995 “Federal ERP System” development has taken off
- 1994 Federal exports for the first time
- 1994 Federal Corp is 70th company Awarded by ISO 9001 Quality Certificate in Turkey
- 1992 First Factory is established and mass production started
- 1990 MCCB production begins
- 1989 Federal Elektrik Corp is Established



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THERMAL-MAGNETIC CIRCUIT BREAKERS (IEC / EN 60947-2)


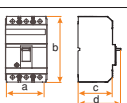
											
Type		F01	F02	F12	F12	F12	F12	F12R (ELCB)	F12R (ELCB)	F21	F21
Rated current - In	A	16,20,25,32,40,50,63,80,100,125,160,200,225		16,20,25,32,40,50,63,80,100,125,160		16,20,25,32,40,50,63,80,100,125,160		50,63,80,100,125,160		16,20,25,32,40,50,63,80,100,125,160	
Number of poles		1		3,4 ^⑫		3		4 ^⑫		3	
Rated operating voltage - Ue (a.c.) 50-60 Hz	V	240		415		415		415		415	
Rated insulation voltage - Ui (a.c.) 50-60 Hz	V	750		750		750		750		750	
Rated impulse withstand voltage - Uimp	kV	8		8		8		8		8	
Test voltage (1 min) (a.c.) 50-60 Hz	V	3.000		3.000		3.000		3.000		3.000	
Rated current adjustment - I ₁	A	Fixed		(0,8-1)In		Fixed		(0,8-1)In		(0,7-1)In	
Instant opening current adjustment - I ₂	① A	① 8xIn		① 8xIn ⑦		① 8xIn ⑦		① 8xIn ⑦		8xIn	
Highest nominal short circuit breaking capacity - I _{cu}	②										
(a.c.) 50-60 Hz 220/240 V (kA rms)		35	65	35	35	35	35	35	35	50	50
(a.c.) 50-60 Hz 380/415 V (kA rms)		12	14	25	25	25	25	25	25	25	25
(a.c.) 50-60 Hz 440 V (kA rms)		-	-	20	20	20	20	20	20	20	20
(a.c.) 50-60 Hz 500 V (kA rms)		-	-	12	12	12	12	12	12	12	12
(a.c.) 50-60 Hz 690 V (kA rms)		-	-	8	8	8	8	8	8	8	8
(d.c.) 250 V ^③ (kA rms)		10	10	15	15	15	15	15	15	15	15
Nominal operating short circuit breaking capacity - I _{cs}	415V-④ (kA rms)	%100 (240V-)		%100		%100		%100		%100	
Rated short circuit making capacity-I _{cm} 415 V-kA peak		74	143 ^⑪	53	53	53	53	53	53	53	53
Breaking duration (in short circuit)	ms	<7		<10		<10		<10		<10	
Category (EN 60947-2 / IEC 60947-2)		A		A		A		A		A	
Thermal fixed - magnetic fixed		■		□		□		□		□	
Thermal adjusted - magnetic fixed		□		■		■		■		□	
Thermal adjusted - magnetic adjusted		—		—		—		—		□	
Thermal fixed - magnetic adjusted		—		—		—		—		—	
Microprocessor unit (Electronic)		—		—		—		—		—	
Residual current threshold (only for F12R)	mA	—		—		—		30-100-300		—	
Residual Current time delay (only for F12R)	ms	—		—		—		50-150-300		—	
Current limiting		■ 		■ 		■ 		■ 		■ 	
Mechanical life	Operation	>15.000		>15.000		>15.000		>15.000		>15.000	
Electrical life	Operation	3000		5000		5000		3000		3000	
Weight	kg	0,85		1 / 1,5		1		1,7		1,1	
Minimum connection sections ^⑤	mm ²	2,5,2,5,4,6,10,10,16,25,35,50,70,95,95		2,5,2,5,4,6,10,10,16,25,35,50,70		2,5,2,5,4,6,10,10,16,25,35,50,70		2,5,2,5,4,6,10,10,16,25,35,50,70		2,5,2,5,4,6,10,10,16,25,35,50,70	
MCCB line / load terminal width	mm	20,5 / 19,7		14,6 / 14,6		14,6 / 14,6		14,6 / 14,6		17,9 / 17,9	
Minimum - maximum tightening torque	Nm	7 - 10		4 - 6		4 - 6		4 - 6		4 - 6	
Undervoltage release ^⑥		—		□		—		□		□	
Shunt trip release ^⑥		—		□		—		□		□	
Auxiliary contact block ^⑥		—		□		—		□		□	
Motor control mechanism		—		—		—		—		—	
Extended rotary handle		—		—		—		—		—	
Lock Mechanism with key		—		□		□		□		□	
Extension bar		□		□		□		□		□	
Terminal cover		—		□		□		□		□	
Inverser (mechanical) lock		—		—		—		—		—	
Phase separator		—		—		—		□		■	
Extension handle		—		—		—		—		—	
Dimensions 	a (mm)	40		90 / 120		90		120		90	
	b (mm)	169		120,5 / 156,5		130		156,5		156	
	c (mm)	90		71		71		71		65,5	
	d (mm)	109		92		92		92		93	

- standard, □ upon request.
- ① see technical characteristic tables for products with value.
- ② I_{cu}: O-t-CO test (O: Open maneuver, CO: Close - Open maneuver, t: Waiting duration)
- ③ For serial connected two poles of the breaker.
- ④ I_{cs}: O - t - CO - t - CO test (O: Open maneuver, CO: Close - Open maneuver, t: Waiting duration)
- ⑤ Connection sections are given in accordance with EN 60947-1 standard.

ELECTRONIC CIRCUIT BREAKERS (IEC / EN 60947-2)

• ⑦ As an additional protection against short circuit currents in Federal electronic circuit breakers, mechanical opening mechanism operating with magnetic field of the short circuit current has been placed on each phase. In this way, mechanical opening unit is tripping in over currents such as short circuit and risk of not tripping in case of electronic card failure has been eliminated. This is a great advantage of Federal circuit breakers.

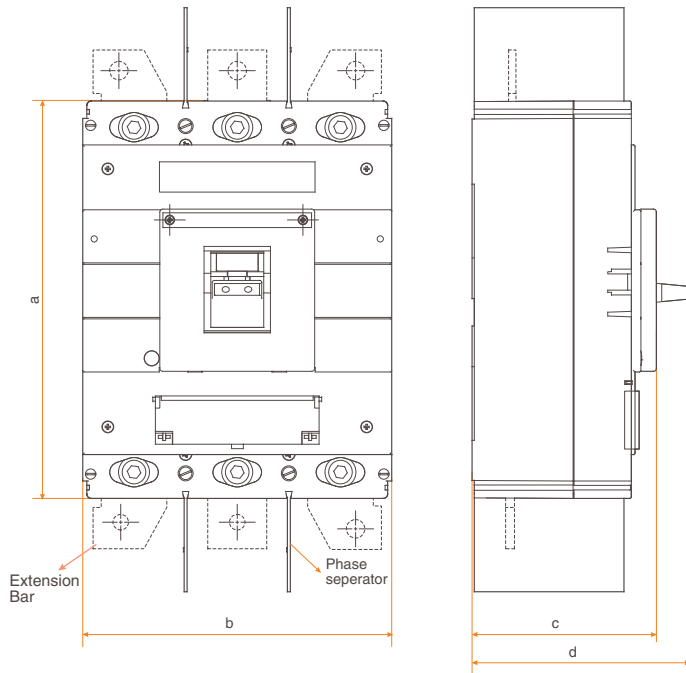


Type		F82E	F83E	F91E	F92E	F101E	F102E	F111E	F112E
Rated current - In	A	300,400,500,630,800		1000,1250		1000,1250,1600		1250,1600,2000,2500	
Number of poles		3, 4 ⑨		3, 4 ⑨		3		3	
Rated operating voltage - Ue (a.c.) 50-60 Hz	V	415		415		415		415	
Rated insulation voltage - Ui (a.c.) 50-60 Hz	V	750		750		750		750	
Rated impulse withstand voltage - Uimp	kV	8		8		8		8	
Test voltage (1 min) (a.c.) 50-60 Hz	V	3.000		3.000		3.000		3.000	
Rated current adjustment area - I1	A	(0,4-1)In		(0,4-1)In		(0,4-1)In		(0,4-1)In	
Instant opening current adjustment area - I2	① A	(2-10)I1		(2-10)I1		(2-10)I1		(2-10)I1	
Highest nominal short circuit breaking capacity - Icu	②								
(a.c.) 50-60 Hz	220/240 V (kA rms)	75	100	80	100	80	100	85	125
(a.c.) 50-60 Hz	380/415 V (kA rms)	50	70	50	65	50	70	50	70
(a.c.) 50-60 Hz	440 V (kA rms)	35	50	35	45	40	45	35	50
(a.c.) 50-60 Hz	500 V (kA rms)	30	42	25	35	25	35	30	42
(a.c.) 50-60 Hz	690 V (kA rms)	20	25	18	25	20	25	20	25
(d.c.)	250 V ③ (kA rms)	—	—	—	—	—	—	—	—
Nominal operating short circuit breaking capacity - Ics	415V - ④ (kA rms)	%100	%75	%50	%50	%100	%50	%100	%50
Rated short circuit making capacity - Icm	415 V - kA peak	105	154	105	143	105	143	105	143
Breaking duration (in short circuit)	ms	<10		<20		<20		<20	
Category (EN 60947-2 / IEC 60947-2)		A		A		A		A	
Thermal fixed - magnetic fixed		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Thermal adjusted - magnetic fixed		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Thermal adjusted - magnetic adjusted		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Thermal fixed - magnetic adjusted		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Microprocessor unit (Electronic)		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Current limiting		<input checked="" type="checkbox"/> ⑦		— ⑦		<input checked="" type="checkbox"/> ⑦		<input checked="" type="checkbox"/> ⑦	
Mechanical life	Operation	> 15.000		>15.000		>15.000		> 15.000	
Electrical life	Operation	3000		3000		3000		3000	
Weight	kg	10		18,5		27		54	
Minimum connection sections ⑤	mm ²	185,240,2(30x5), 2(40x5),40x12		40x15 , 2(40x12)		2(40x10),2(40x15)		80x15 , 2(80x10), 2(80x15)	
MCCB input / output terminal weight	mm	52,4 / 52,4		45,7 / 45,7		46,5 / 46,5		85,5 / 85,5	
Minimum - maximum tightening torque	N	30 - 40		35 - 50		35 - 50		35 - 50	
Undervoltage release ⑧		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Shunt trip release ⑧		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Auxiliary contact block ⑧		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Motor control mechanism		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Extended rotary handle		<input type="checkbox"/>		<input type="checkbox"/>		—		—	
Lock Mechanism with key		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Extension bar		<input type="checkbox"/>		<input checked="" type="checkbox"/> ⑥		<input checked="" type="checkbox"/> ⑥		<input checked="" type="checkbox"/> ⑥	
Terminal cover		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Inverser (mechanical) lock		<input type="checkbox"/>		<input type="checkbox"/>		—		<input type="checkbox"/>	
Phase separator		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>		—	
Extension handle		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Dimensions 	a (mm)	210 / 280		210 / 280		210		392	
	b (mm)	280		370		370		412	
	c (mm)	111		128		155		250	
	d (mm)	162		180		203		320	

- standard, upon request.
- ① see technical characteristic tables for products with value.
- ② Icu: O-t-CO test (O: Open maneuver, CO: Close - Open maneuver, t: Waiting duration)
- ③ For serial connected two poles of the breaker.
- ④ Ics : O - t - CO - t - CO test (O : Open maneuver, CO : Close - Open maneuver, t : Waiting duration)
- ⑤ Connection sections are given in accordance with EN 60947-1 standard.
- ⑥ F91E,F92E,F101E,F102E,F111E and F112E type circuit breakers are manufactured with long busbar as the standard.

- ⑦ As an additional protection against short circuit currents in federal electronic circuit breakers, mechanical opening mechanism operating with magnetic field of the short circuit current has been placed on each phase. In this way, mechanical opening unit is open in over currents such as short circuit and risk of not opening in case of electronic card failure has been eliminated. This is a great advantage of Federal circuit breakers.
- ⑧ Accessories can be easily mounted by the user by opening the front cover of circuit breakers. (Plug-In)
- ⑨ Models with N refers to 4 pole

MOLDED CASE CIRCUIT BREAKER TECHNICAL DIMENSIONS



Type	Pole	Dimensions (mm)			
		a	b	c	d
F01 / F02	1	169	40	90	109
F12	3	120,5	90	71	92
F12	4	156,5	120	71	92
F12 (Fixed)	3	130	90	71	92
F12R	4	156,5	120	71	92
F21	3	156	90	65,5	93
F31 / F32 / F33	3	166	106	91	116
F31 / F32 / F33	4	204	140	91	116
F31S	3	166	106	91	116
F31R	4	204	140	91	116
F51 / F52 / F53 (*)	3	255	105	116,5	145
F51 / F52 / F53 (*)	4	255	140	116,5	135
F61 / F62	3	257	140	114	140
F61S	3	257	140	114	140
F71 / F72	3	270	210	111	159
F82 / F83	3	280	210	111	159
F82 / F83	4	280	280	111	159
F82E / F83E	3	280	210	111	162
F82E / F83E	4	280	280	111	162
F91E / F92E	3	370	210	128	180
F91E / F92E	4	370	280	128	180
F101E / F102E	3	370	210	155	203
F111E / F112E	3	412	392	250	320

(*) For F51 / F52 / F53 300A and 400A are b dimensions, 3 pole 121,5 mm, 4 pole 156,5 mm

MOLDED CASE CIRCUIT BREAKER ACCESORIES



Earth leakage protection relays
0,03 - 30A



Toroidal Transformer
60mm - 110mm - 160mm - 210mm



Motor Control Mechanisms



Changeover Relay



Extended Rotary Handle



Undervoltage Release



Shunt Trip Release



Auxiliary Contact Block



Lock Mechanism with key



Operating Handle
Extension



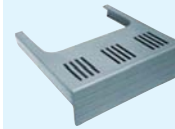
Mechanical Lock



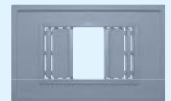
Extension Bars



Connection Terminals



Terminal Cover



Panel Frame

AUTOMATIC TRANSFER SWITCHES

In the enterprises where power cuts are frequent, where uninterrupted power is needed and where interruption can cause huge damages (such in hospitals, shopping centers, banks, factories etc...), these can be securely used in order to realize the load transfer.

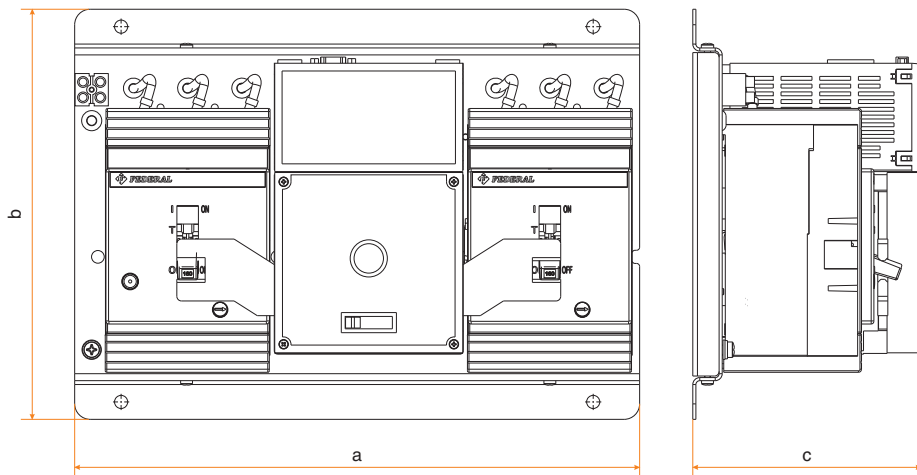
- It can be produced from 16A to 1600A MCCB (from F12 to F102E) / from 2A to 125A for MCB 10kA
- In the system that is made by using Federal Automatic Transfer Switch there are manual and automatic control choices.
- Transfer time adjustment and generator start-stop delay time adjustment can be made in Federal Automatic Transfer Switch.
- In the system that has easy and secure assembly opportunity, in the situations that both grid and the generator run, there is a smart controlling unit where results can be observed.



Technical Features:

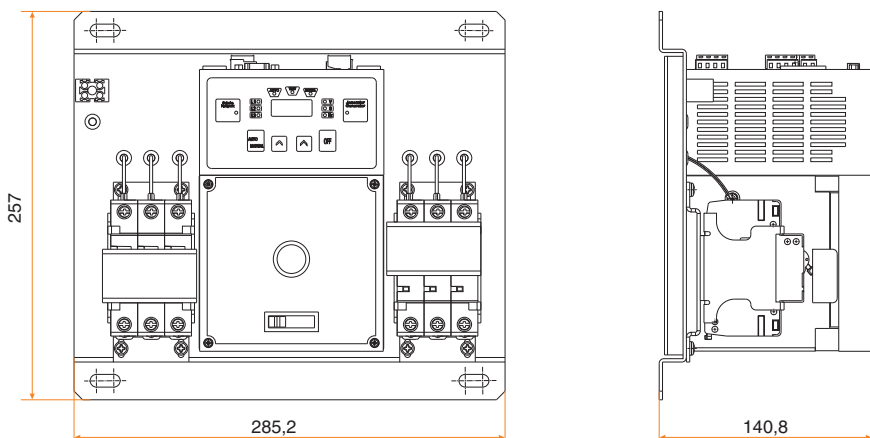
Type	MCCB	MCB
Standard	EN 60947-6-1	EN 60947-6-1
Circuit Breaker Rated Current (In)	16A ~1600A	2A ~125A
Pole number	3, 4	3, 4
Control Voltage	140 - 270V	140 - 270V
Transfer time delay	5 - 90 sn. (adjustable)	5 - 90 sn. (adjustable)
System Voltage	415V	415V
Mechanical Life	10.000	10.000
Operating Temperature	-20 ~+60	-20 ~+60
Protection Class	IP20	IP20
Pollution Level	III / 3	III / 2

MCCB Technical Drawings and Their Ordering Codes






Type	Dimensions (mm)		
	a	b	c
FATS-F1	365	247,4	151,5
FATS-F1N	425	259,2	151,5
FATS-F3	380	265	147
FATS-F3N	448	304	159
FATS-F5	460	342	206
FATS-F5N	495	342	206
FATS-F7	600	346	216
FATS-F8	600	346	216
FATS-F8N	740	346	216
FATS-F9	600	436	235
FATS-F9N	740	436	235
FATS-F10	600	436	260

MCB Technical Drawings and Their Ordering Codes



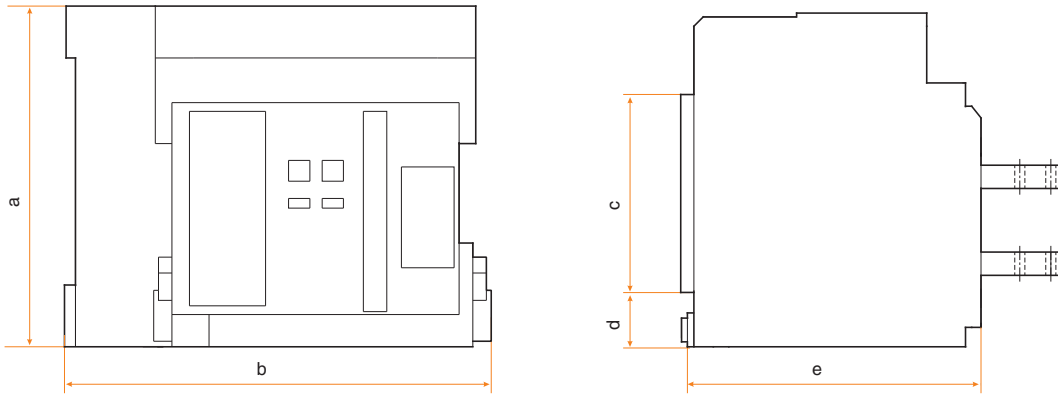
AIR TYPE CIRCUIT BREAKERS (IEC / EN 60947-2)

													
Type		F121E	F122E	F123E	F131E	F132E	F133E	F141E	F142E	F143E	F151E	F152E	F153E
Rated current - In	A	630,800,1000 1250,1600,2000			2500, 3200			4000			5000, 6300		
Number of pole		3 / 4			3 / 4			3 / 4			3 / 4		
Rated operating voltage - Ue (a.c.) 50-60 Hz	V	415			415			415			415		
Rated insulation voltage - Ui (a.c.) 50-60 Hz	V	1000 V			1000 V			1000 V			1000 V		
Rated impulse withstand voltage - Uimp	kV	8			8			8			8		
Test voltage (1 min) (a.c.) 50-60 Hz	kV	3			3			3			3		
Rated Current Adjustment field	In	(0,4-1)In			(0,4-1)In			(0,4-1)In			(0,4-1)In		
Rated ultimate short circuit breaking capacity - Icu 415V~	(kA rms)	70	80	100	70	80	100	70	80	100	70	80	120
Rated service short circuit breaking capacity - Ics 415V~	(kA rms)	35	50	65	35	65	80	35	65	80	35	65	100
Rated short time withstand capacity - Icw 1s 415 V~	(kA rms)	35	50	65	35	65	80	50	65	80	50	65	100
Category (EN 60947-2 / IEC 60947-2)		A, B			A, B			A, B			A, B		
Opening type		Electronic			Electronic			Electronic			Electronic		
Assembly method		Fixed / Drawout			Fixed / Drawout			Fixed / Drawout			Drawout		
Long time delay current	Ir1	(0,4-1)In			(0,4-1)In			(0,4-1)In			(0,4-1)In		
Long time delay interval	tl s	15-480			15-480			15-480			15-480		
Short time delay current	Ir2	(0,4-15)In			(0,4-15)In			(0,4-15)In			(0,4-15)In		
Short time delay interval	ts s	0,1 - 1			0,1 - 1			0,1 - 1			0,1 - 1		
Instantaneous breaking current	Ir3	In-50 kA			In-50 kA			In-50 kA			In-50 kA		
Ground fault current	Ir4	(0,2-0,8)In			(0,2-0,8)In			(0,2-0,8)In			(0,2-0,8)In		
Mechanical life	With maintenance	10000			10000			8000			10000		
	Without maintenance	3000			3000			3000			2500		
Power losses per pole	Drawout	38, 47, 77, 110, 150, 160			210, 240			320			350, 420		
	Fixed	15, 21, 35, 50, 75, 85			90, 150			230					
Accessories													
Undervoltage release *		<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
Undervoltage release with time delay		<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
Shunt trip		<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
Closing coil		<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
Auxiliary contact block		<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
Motor control mechanism		<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
Inverser lock		<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		

* Opening time can be set as 1s, 3s, 5s, 7s, 9s, 10s.
 standards, optional

AIR TYPE CIRCUIT BREAKER ACCESORIES


AIR TYPE CIRCUIT BREAKERS TECHNICAL DIMENSIONS



Type	Assembly method	Pole	Dimensions (mm)				
			a	b	c	d	e
F121E/F122E/F123E	Fixed	3	402	340	258	34	290
F121E/F122E/F123E	Fixed	4	402	435	258	34	290
F121E/F122E/F123E	Drawout	3	439	375	258	70	374
F121E/F122E/F123E	Drawout	4	439	470	258	70	374
F131E/F132E/F133E	Fixed	3	402	400	258	34	290
F131E/F132E/F133E	Fixed	4	402	515	258	34	290
F131E/F132E/F133E	Drawout	3	439	435	258	70	374
F131E/F132E/F133E	Drawout	4	439	550	258	70	374
F141E/F142E/F143E	Fixed	3	402	429,5	258	34	290
F141E/F142E/F143E	Fixed	4	402	545	258	34	290
F141E/F142E/F143E	Drawout	3	439	440	258	70	374
F141E/F142E/F143E	Drawout	4	439	550	258	70	374
F151E/F152E/F153E	Drawout	3	449	835	258	34	290
F151E/F152E/F153E	Drawout	4	449	950	258	34	290

MINIATURE CIRCUIT BREAKERS (IEC / EN 60898-1), (IEC / EN 60947-2)**



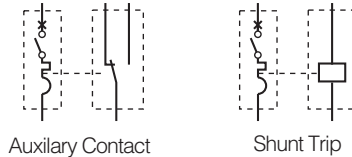
Type		FM3	FM6E	FM6	FM10	FM10L
Characteristic		B, C, D				B, C
Breaking capacity kA	rms	3	6	6	10	10
Rated current	A	0.5*, 1*, 2, 4, 6, 10, 16, 20, 25, 32, 40, 50, 63				80, 100, 125
Rated operating voltage - Ue	V	AC 230/400V 50-60 Hz - DC 60V/pole				
Rated insulation voltage - Ui	V	630				
Rated impulse withstand voltage - Uimp	kV	6				
Number of poles		1, 1+1, 2, 3, 3+1, 4			1, 2, 3, 4	
Mechanical / Electrical life	operation	20.000 / 10.000				
Min. - max. connection section	mm ²	1 ... 25			1 ... 50	
Min. - max. clamping torquw	Nm	2 ... 3			3 - 5	

* Rated current of FM6 and FM10 is from 0,5A to 1A

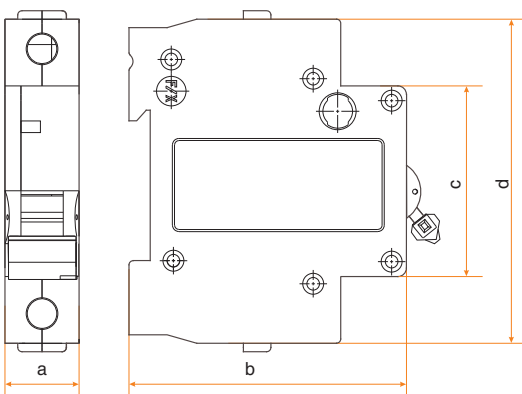
Accessories



Tip	
Shunt Trip - FM10L-AB	AC 230V
Auxiliary Contact - FM10L-YK	1NO / 1NC



MINIATURE CIRCUIT BREAKERS TECHNICAL DIMENSIONS



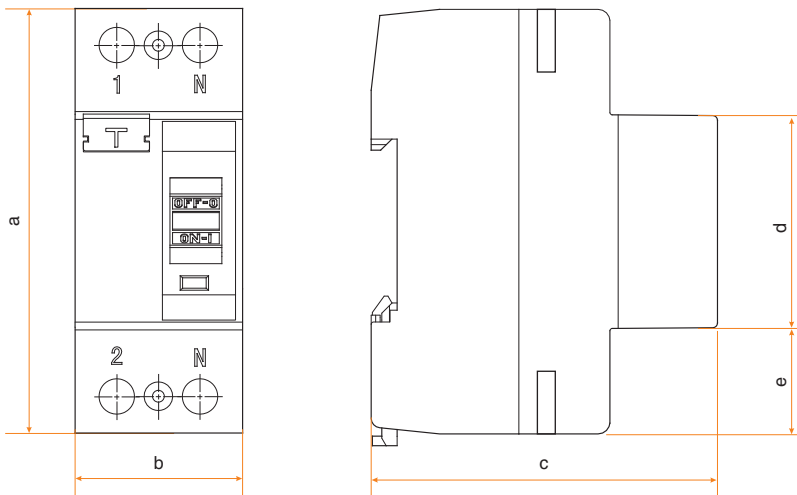
Type	Pole	Dimensions (mm)			
		a	b	c	d
FM3	1	17,7	60,5	45	76,5
FM3	2	35,5	60,5	45	76,5
FM3	3	53,5	60,5	45	76,5
FM3	4	71,5	60,5	45	76,5
FM6 / FM10	1	17,8	60	45	90
FM6 / FM10	2	35,6	60	45	90
FM6 / FM10	3	53,6	60	45	90
FM6 / FM10	4	71,6	60	45	90
FM6E	1	16,5	64	44	80
FM6E	2	33	64	44	80
FM6E	3	49,5	64	44	80
FM6E	4	66	64	44	80
FM10L	1	26,3	61,5	45	90
FM10L	2	52,6	61,5	45	90
FM10L	3	78,9	61,5	45	90
FM10L	4	105,2	61,5	45	90

RESIDUAL CURRENT CIRCUIT BREAKERS (IEC / EN 61008-1), (IEC / EN 61008-2-1)



Type	FK2	FK2L	FK4	FK4L
Nominal residual current (mA)	30, 300	30, 300	30, 300	30, 300
Rated current (A)	25, 40, 63	80, 100, 125	25, 40, 63	80, 100, 125
Rated voltage (V)	240 / 415	240 / 415	240 / 415	240 / 415
Closing-breaking capacities (Im/IΔm), (A)	630	630	630	630
Fused short circuit current (Inc/IΔc), (A)	10000	10000	10000	10000
Frequency (Hz)	50-60	50-60	50-60	50-60
Number of poles	2	2	4	4
Weight (gr)	250	260	470	530

RESIDUAL CURRENT CIRCUIT BREAKERS TECHNICAL DIMENSIONS



Type	Dimensions (mm)				
	a	b	c	d	e
FK2	90	36	73	45	22
FK2L	90	35,5	69,5	45	22
FK4	90	71	73	45	22
FK4L	90	70,5	69,5	45	22

RESIDUAL CURRENT CIRCUIT BREAKERS WITH OVERCURRENT PROTECTION (RCBO)



Technical Specification		
Nominal residual current	mA	30 - 300
Rated current	A	6, 10, 16, 20, 25, 32
Rated voltage	V	230 V AC
Rated short-circuit capacity	A	10.000
Frequency	Hz	50 - 60
Number of poles		1P + N
Characteristic		B, C
Tripping duration	s	Instantaneous ≤ 0.1
Mechanical / Electrical life		20.000 / 10.000

DISCONNECTORS (IEC / EN 60947-3)



Type	FMS
Number of poles	1, 2, 3, 4
Utilization class	AC-22A
Rated current I_n	40, 63, 80, 100
Rated operating voltage U_i	750V
Short-time withstand current	12x I_n
Short circuit making capacity	20x I_n
Mechanical / Electrical life	20.000 / 10.000

INSTALLATION CONTACTORS (IEC / EN 60947-4-1), (IEC / EN 61095)



Number of Poles	I_e (A) AC1 / AC7a	Operating Voltage (AC) V	Isolation Voltage U_i (V)	Contact Type
2	20	230	500	2NO
4	40	400	500	4NO
	63	400	500	4NO

IMPULSE RELAY



Type	Coil VAC 50 / 60 Hz	Coil VDC	Power Circuit AC1	Width in 17,5 mm
1NO	230	110	16A-250V	1
2NO	230	110	16A-250V	1
1NC+1NO	230	110	16A-250V	1

MINIATURE CIRCUIT BREAKER BOXES (IEC / EN 60670-1)



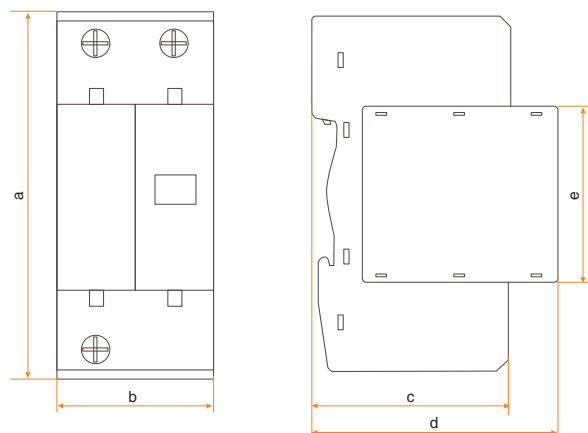
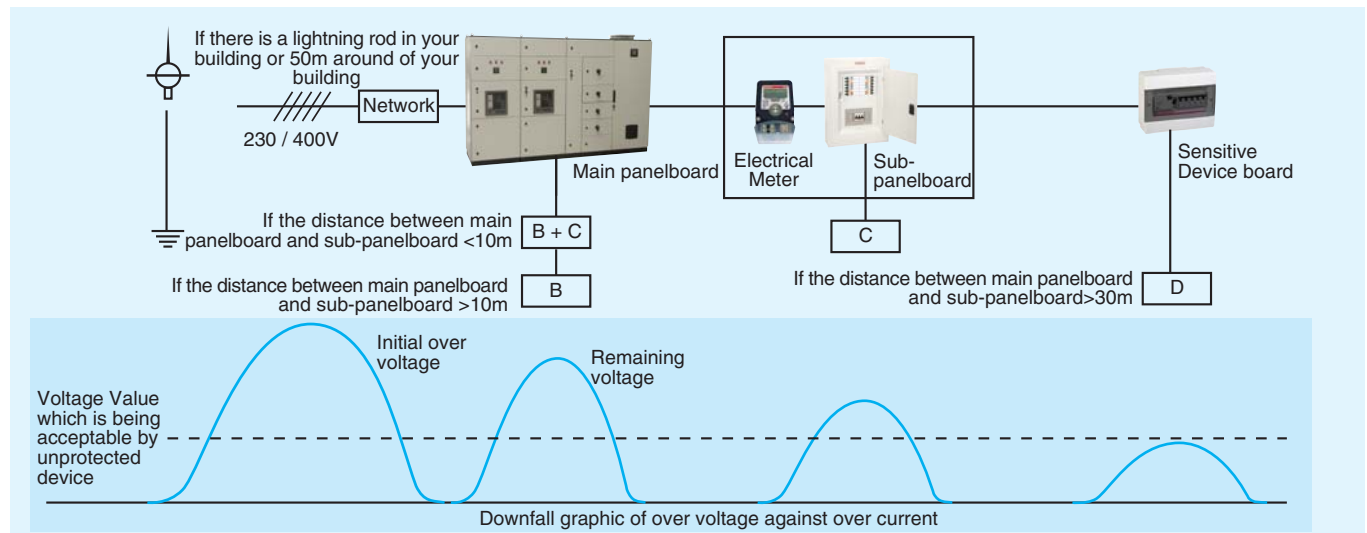
Technical Specification	
Material	Thermoplastic
Number of ways	1, 2, 9, 12, 18, 24
Recommended assembly temperature	-15°C +60°C
Field of use	Flush mounted / Surface mounted
Color	White

Symmetrical and asymmetrical used cover. 180° opening cover.

SURGE PROTECTIVE DEVICES









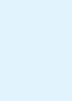
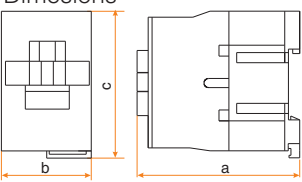











Type	FSPD-B50	FSPD-BC25	FSPD-C	FSPD-D20
Rated a.c. operating voltage Un	240 / 415	240 / 415	240 / 415	240 / 415
Maximum continuous operating voltage Uc	275	300	440	440
Voltage protection level Up	≤2	≤1,2	≤2	≤1,6
Lighting impulse current (10/350 μ s)Iimp	50	25	-	-
Charge Q	25	12,5	-	-
Specific energy W/R	625	160	-	-
Max. discharge current (8 / μ 20 μ s)Imax	-	-	40	20
Nominal Discharge Current (8 / μ 20 μ s) In	100	25	20	10
Response time tA	<100	<25	<25	<25
Pole	3P+N	3P+N	1P+N, 3P+N	1P+N
Test standard	IEC 61643-11	IEC 61643-11	IEC 61643-11	IEC 61643-11
The cross section (L/N)	16-25	16-25	10...16	6
The cross section (PE)	25-35	25-35	10...25	10
Fuse or switch	100	125	32	25
Operating environment C°	-40 ~+85	-40 ~+85	-40 ~+85	-40 ~+85
Relative humidity (25 C°)	≤95%	≤95%	≤95%	≤95%
For mounting On	DIN rail 35mm	DIN rail 35mm	DIN rail 35mm	DIN rail 35mm
Material of outer covering	Fiber glass reinforced plastic	V0 PA66	Burning - proff Nylon	Burning - proff Nylon



Type	Pole	Dimensions (mm)				
		a	b	c	d	e
FSPD-B50	3P+N	90	108	50	62	45
FSPD-BC25	3P+N	93	143	50	65	45
FSPD-C	1P+N	90	36	50	62	45
FSPD-C	3P+N	90	72	50	62	45
FSPD-D20	1P+N	90	36	50	62	45

CONTACTORS (IEC / EN 60947-4-1)

											
Type		FC06M	FC09M	FC09D	FC12D	FC18D	FC25D	FC32D	FC40D	FC50D	
Utilization class : AC3 I _e max U _e <440V	A	6	9	9	12	18	25	32	40	50	
Number of pole		3	3	3 / 4	3 / 4	3	3 / 4	3	3 / 4	3 / 4	
Utilization class : AC1 I _e max	40 °C	16	16	25	25	32	40	50	60	80	
	55 °C A	12	12	20	20	26	32	44	55	70	
Rated insulation voltage-U _i (a.c.) 50-60Hz V		630	630	1000	750	750	750	750	750	750	
Rated impulse withstad voltage - U _{imp} kV		8	8	8	8	8	8	8	8	8	
Motor control 3 ~AC3 Driving stopping	220 / 230 V kW	1,5	2,2	2,2	3	4	5,5	7,5	11	15	
	380 / 400 V kW	2,2	4	4	5,5	7,5	11	15	18,5	22	
	415 V kW	2,2	4	4	5,5	9	11	15	22	25	
	500 V kW	3	4	5,5	7,5	10	15	18,5	22	30	
	660 / 690 V kW	3	4	5,5	7,5	10	15	18,5	30	33	
Rated current AC 5A	A	9	12	12	16	25	35	45	55	70	
Weight	3 pole	0,16	0,16	0,33	0,33	0,345	0,52	0,55	1,14	1,14	
	4 pole	-	-	0,33	0,33	-	0,59	-	1,29	1,29	
Number of auxiliary contacts		1 NO or 1 NC	1 NO or 1 NC	1 NO or 1 NC / -	1 NO or 1 NC / -	1 NO or 1 NC	1 NO or 1 NC / -	1 NO or 1 NC	1 NO + 1 NC / -	1 NO + 1 NC / -	
Coil power consumption (at holding) W		1	1	1,5	1,5	1,5	1,5	2,5	2,5	2,5	
Power loss per pole W		0,16	0,30	0,25	0,45	1,00	1,00	1,30	2,00	4,50	
Max. - min. tightening torque Nm		1-1,5	1-1,5	1-1,5	1-1,5	1-1,5	1,2-2	1,2-2	3,5-4,5	3,5-4,5	
Dimesions 	a (mm)	AC 57 DC -	57	80/80	80/80	86	94 / 94	99	115 / 115	115 / 115	
	b (mm)		45,5	45,5	46 / 46	46 / 46	46	57 / 63	57	75 / 83	75 / 83
	c (mm)		58	58	75 / 75	75 / 75	75	84 / 84	84	128 / 128	128 / 128
Easily replaced coils											
Auxiliary contact blocks (Side assembly) 1. figure is number of NO contacts 2. figure is number of NC contacts								FCBS-F11 FCBS-F20 FCBS-F02			
Auxiliary contact blocks (Front assembly) 1. figure is number of NO contacts 2. figure is number of NC contacts						FCB-F20 FCB-F02 FCB-F11		FCB-F40 FCB-F31 FCB-F22 FCB-F13 FCB-F04			
Mechanical Lock											

Note: Auxiliary contact blocks are assembled on front face of the contactor

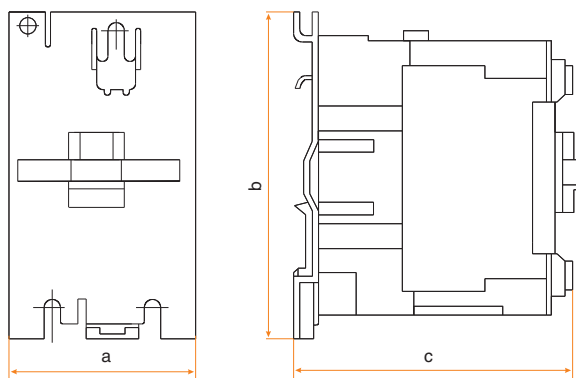
NO : Normally open contact

FC65D	FC80D	FC95D	FC115D	FC150D	FC220D	FC260D	FC300D	FC400D	FC475D	FC580D	FC650D	FC750D
65	80	95	115	150	220	260	300	400	475	580	650	750
3 / 4	3 / 4	3 / 4	3	3	3	3	3	3	3	3	3	3
100	125	125	200	200	300	300	350	500	600	750	850	1000
80	100	100	180	180	260	260	300	450	550	650	780	850
750	750	750	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
8	8	8	8	8	8	8	8	8	8	8	8	8
18,5	22	25	30	40	60	80	90	110	140	180	200	220
30	37	45	55	75	110	140	160	200	250	315	355	400
37	45	45	59	80	116	140	160	200	250	315	355	400
37	55	55	75	90	132	180	200	230	290	360	410	470
37	45	45	80	100	160	200	250	300	375	470	530	650
80	100	115	140	180	-	-	-	-	-	-	-	-
1,14	1,38	1,38	2,1	2,1	4,7	4,7	8,5	15	15	17,4	17,4	22
1,29	1,54	1,54	-	-	-	-	-	-	-	-	-	-
1NO +1NC /-	1NO +1NC /-	1NO +1NC /-	-	-	-	-	-	-	-	-	-	-
2,5	3	3	3,5	3,5	3,5	3,5	8	20	20	22	22	24
6,50	8,00	11,50	8	13	17	24	27	37	53	43	53	55
3,5-4,5	6-10	6-10	8-12	8-12	15-20	15-20	20-25	20-25	20-25	30-40	30-40	30-40
115 / 115	127 / 127	127 / 127	118	118	183	183	223	298,7	298,7	257	257	298
172 / -	183 / -	183 / -	-	-	-	-	-	-	-	-	-	-
75 / 83	75 / 95	75 / 95	120	120	170	170	218	205,7	205,7	310	310	229
128 / 128	128 / 128	128 / 128	154	154	175	175	210	185,5	185,5	304	304	210
 FCC-D6			 FCC-D8		 FCC-D10			 FCC-D12				
 FCBS-F11 FCBS-F20 FCBS-F02												
				 FCB-F20 FCB-F02 FCB-F11		 FCB-F40 FCB-F31 FCB-F22 FCB-F13 FCB-F04						

Give coil voltages of the contactors in accordance with the table below





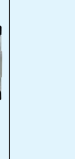

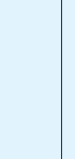





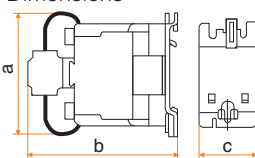
	24V	42V	48V	110V	220V	230V	240V	380V	415V	440V	500V
AC	A5	D5	E5	H5	K5	N5	R5	S5	T5	U5	V5
DC	A6		E6	H6	K6					U6	

Example: 9DD-A5013-0018 mins 24V coil voltage 18A (AC3) 1NC contactors.

CONTACTORS TECHNICAL DIMENSIONS


Type	Type	Pole	Dimensions (mm)		
			a	b	c
FC06M	AC	3	45,5	58	57
FC09M	AC	3	45,5	58	57
FC09D	AC	3	46	75	80
FC09D	AC	4	46	75	80
FC09D	DC	3	46	75	114
FC12D	AC	3	46	75	80
FC12D	AC	4	46	75	80
FC12D	DC	3	46	75	114
FC18D	AC	3	46	75	86
FC18D	DC	3	46	75	120
FC25D	AC	3	57	84	94
FC25D	AC	4	63	84	94
FC25D	DC	3	57	84	130
FC32D	AC	3	57	84	99
FC32D	DC	3	57	84	130
FC40D	AC	3	75	128	115
FC40D	AC	4	83	128	115
FC40D	DC	3	75	128	172
FC50D	AC	3	75	128	115
FC50D	AC	4	83	128	115
FC50D	DC	3	75	128	172
FC65D	AC	3	75	128	115
FC65D	AC	4	83	128	115
FC65D	DC	3	75	128	172
FC80D	AC	3	75	128	127
FC80D	AC	4	95	128	127
FC80D	DC	3	75	128	183
FC95D	AC	3	75	128	127
FC95D	AC	4	95	128	127
FC95D	DC	3	75	128	183
FC115D	AC	3	12	154	118
FC150D	AC	3	12	154	118
FC220D	AC	3	170	175	183
FC260D	AC	3	170	175	183
FC300D	AC	3	218	210	223
FC400D	AC	3	205,7	185,5	298,7
FC475D	AC	3	205,7	185,5	298,7
FC580D	AC	3	310	304	257
FC650D	AC	3	310	304	257
FC750D	AC	3	209	204	255

CONTACTORS (IEC / EN 60947-4-1)

													
Contactor Type (DK)		FC09	FC12	FC18	FC25	FC32	FC40	FC50	FC65	FC80	FC95	FC115	FC150
Utilization Class AC-6b Iemax Ue £ 400 / 440 V A		13	16	22	26	33	44	53	60	79	85	92	105
Rated thermal current (Ith) A		25	25	32	40	50	60	80	80	125	125	200	200
Rated insulation voltage (kVAr) Q £ 55°C	220/240 V	5	7	9	10	15	20	25	25	35	40	45	50
	400/440 V	10	12,5	16,7	20	25	33,3	40	45,7	60	65	70	80
Rated insulation voltage V		630	630	630	630	630	630	630	630	630	630	630	630
Rated impulse withstand voltage kV		6	6	6	8	8	8	8	8	8	8	8	8
Weight kg		0,39	0,39	0,40	0,58	0,60	1,36	1,36	1,36	1,58	1,58	2,65	2,65
Coil power consumption W		1,5	1,5	1,5	1,5	2,5	2,5	2,5	2,5	3	3	3,5	3,5
Power loss per pole W		0,16	0,38	0,65	1,00	1,44	2,00	2,64	4,16	5,50	5,50	8,00	8,00
Max. - min. tightening torque Nm		1,1,5	1-1,5	1-1,5	1,2-2	1,2-2	3,5-4,5	3,5-4,5	3,5-4,5	6-10	6-10	6-10	6-10
Electrical life (opening-closing)		250.000											
Number of auxiliary contacts		1NO+1NC					2NO+1NC					1NO / 1NC	
Dimensions													
a (mm)		130	130	140	140	150	200	200	200	210	210	230	230
b (mm)		117	117	122	131	136	150	150	150	150	150	250	250
c (mm)		46	46	46	57	57	75	75	75	75	75	90	90

THERMAL OVERLOAD RELAYS (IEC / EN 60947-4-1)



Type	FTR25	FTR95
Current Adjustment Area (A)	0.1 ... 32	30 - 93
Opening Class Class (A)	10	10
Rated Insulation Voltage (Ui) (V)	690	690
Rated Impulse Withstand Voltage (Uimp) kV	6	6
Operating Height m	2000	2000
Temperature Compensation C	-25...+55	-25...+55
Operating Frequency Hz	50/60	50/60
Auxiliary Contact Ie 220V	2.73	2.73
1NO+1NC AC15 380V	1.58	1.58
Dimension Length x width x depth (mm)	47x43,5x88	55x70x112

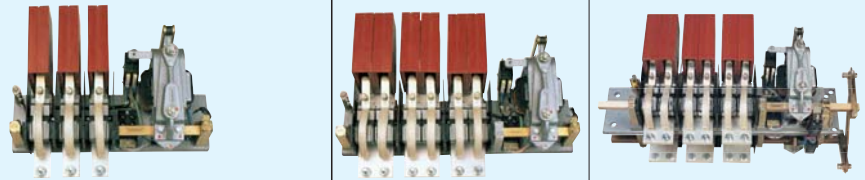
MOTOR PROTECTION SWITCHES



Type	Thermal adjustment area (A)	Standard Motor Power				
		1 Phase	3 Phase			
		220-240V	220-240V	380-415V	500V	660-690V
FMK 25-0,16	0,1...0,16	0,03	-	0,03	-	-
FMK 25-0,25	0,16...0,25	0,06	0,03	0,06	0,09	0,12
FMK 25-0,4	0,25...0,4	0,06	0,06	0,09	0,12	0,09/0,12
FMK 25-0,63	0,4...0,63	0,9/0,12	0,06/0,09	0,18	0,18	0,25/0,37
FMK 25-1	0,63...1	0,18	0,09/0,18	0,25	0,25/0,37	0,55/0,75
FMK 25-1,6	1...1,6	0,25	0,25	0,37/0,55	0,55	0,75/1,1
FMK 25-2,5	1,6...2,5	0,37	0,37/0,55	0,55/0,75	1,1/1,5	1,5
FMK 25-4	2,5...4	0,55/0,75	0,55/1,1	1,1/1,5	1,5/2,2	2,2/3,7
FMK 25-6,3	4...6,3	1,1	1,1	2,2/3	3/4	3,7/5,5
FMK 25-10	6...10	1,5	2,2	3/4	4/5,5	5,5/7,5
FMK 25-14	9...14	2,2	3/3,7	5,5	7,5	7,5/11
FMK 25-18	13...18	3/3,7	3,7/4	7,5	11	15
FMK 25-23	17...23	3,7/4	5,5	11	15	11/15
FMK 25-25	20...25	-	5,5/7,5	11	15	18,5/22
FMK 25-32	24...32	-	7,5	15	15/18,5	22

Dimension Lenght x width x depth: 88x45x75mm

HIGH CURRENT CONTACTORS (IEC / EN 60947-4-1)



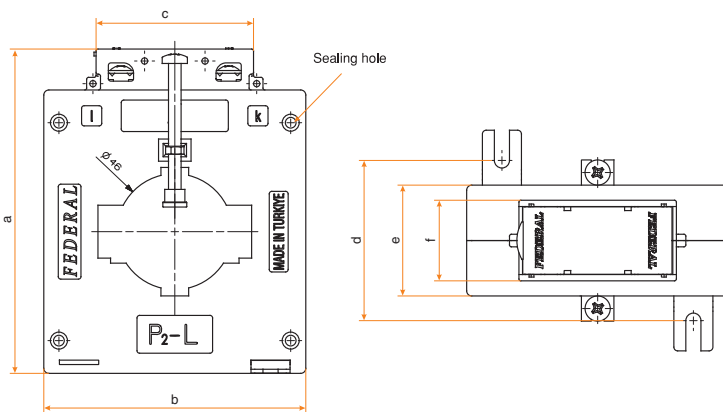
Type		EC 300	EC 400	EC 630	EC 800	EC 1250	EC 1600	EC 2000	EC 2500
Utilization class (Ith) le max	AC1 ≤ 40°C	300	400	630	800	1250	1600	2000	2500
Number of poles *		1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3	1,2,3	1,2,3	1,2,3
Rated impulse withstand voltage	kV	8	8	8	8	8	8	8	8
For motor control (Squirrel cage motors) 3 ~ AC3	220 / 230 V kW	75	110	160	200	370	470	580	730
	380 / 400 V kW	132	200	280	335	630	790	980	1230
	500 V kW	180	257	355	450	740	960	1190	1490
In compensation circuits	380 / 400 V kVAr	150	200	250	300	450	525	655	820
Rated insulation voltage	Ui ~ V	690	690	690	690	690	690	690	690
Coil voltage	Us (AC) ~ V	24, 48, 110, 220, 240, 380, 415							
	Us (DC) - V	24, 48, 110, 220, 240, 380, 415							
Coil voltage operating interval	xUs ~ V	0,72 - 1,1							
Auxiliary contacts	NA (10A) Ad	2	2	2	2	2	2	4	4
	NK (10A) Ad	2	2	2	2	2	2	4	4
Coil power consumption	pulling W	800	800	800	800	880	880	1760	1760
	holding W	26	26	26	26	35	35	70	70
Mechanical life	Operation	50000	50000	50000	50000	50000	50000	50000	50000
Dimensions	depth mm	245	245	245	245	245	245	500	500
	wideness mm	462	462	462	462	577	577	710	710
	height mm	370	370	370	370	370	370	370	370
Weight	kg	28,6	29,2	29,8	30,4	44,2	44,8	88,4	89,6
Power loss per pole	W	6	11	26	42	52	85	80	125

Us:Control supply voltage. * High Current Contactors are manufactured with 3 poles as a standard.

CURRENT TRANSFORMERS (IEC / EN 60044-1)



Type	Ct mounting method	Rated current (A)	Rated Power (VA) Class				Weight (kg)	Cable (max) mm.	Highest voltage for equipment (V)	Rated short-time thermal current (I _{th})	Rated continuous thermal current (I _{cth})
			0,2s	0,2	0,5s	0,5					
FAT-30B	with busbar	30/5	-	2,5	5	10	0,60	Ø12	720	60	1,2 x I _n
FAT-30B		40/5	-	2,5	5	10					
FAT-30B		50/5	-	2,5	5	10					
FAT-30B		60/5	-	2,5	5	10					
FAT-30B		75/5	-	2,5	5	10					
FAT-30B		80/5	-	2,5	5	10					
FAT-30B		100/5	-	2,5	5	10					
FAT-30B		125/5	-	2,5	5	10					
FAT-30B		150/5	-	2,5	5	10					
FAT-30B		200/5	-	2,5	7,5	10					
FAT-30B		250/5	2,5	2,5	10	10					
FAT-30C		without busbar	150/5	-	-	2,5					
FAT-30C	200/5		-	2,5	5	10					
FAT-30C	250/5		2,5	2,5	10	10					
FAT-30C	300/5		2,5	5	10	10					
FAT-30	without busbar	150/5	-	-	5	7,5	0,60	Ø24	720	100	1,2 x I _n
FAT-30		200/5	-	2,5	7,5	10					
FAT-30		250/5	2,5	5	10	10					
FAT-30		300/5	5	10	10	10					
FAT-40	without busbar	200/5	-	-	2,5	5	0,38	Ø31	720	100	1,2 x I _n
FAT-40		250/5	-	-	5	7,5					
FAT-40		300/5	-	2,5	7,5	10					
FAT-40		400/5	2,5	5	10	10					
FAT-40		500/5	5	10	10	10					
FAT-40	600/5	7,5	10	10	10						
FAT-60	without busbar	500/5	-	2,5	7,5	10	0,60	Ø46	720	100	1,2 x I _n
FAT-60		600/5	-	2,5	10	10					
FAT-60		750/5	2,5	7,5	10	10					
FAT-60		800/5	5	7,5	10	10					
FAT-60		1000/5	7,5	10	10	10					
FAT-60		1200/5	10	10	10	10					
FAT-60		1250/5	10	10	10	10					
FAT-100	without busbar	1000/5	5	10	15	15	0,94	Ø62	720	100	1,2 x I _n
FAT-100		1200/5	7,5	15	15	15					
FAT-100		1250/5	7,5	15	15	15					
FAT-100		1500/5	15	15	15	15					
FAT-100		1600/5	15	15	15	15					
FAT-100		2000/5	15	15	15	15					
FAT-130	without busbar	1500/5	15	15	15	15	1,50	Ø125	720	100	1,2 x I _n
FAT-130		1600/5	15	15	15	15					
FAT-130		2000/5	20	20	20	20					
FAT-130		2500/5	30	30	30	30					
FAT-130		3000/5	30	30	30	30					
FAT-130		3200/5	30	30	30	30					
FAT-130		4000/5	40	40	40	40					



Type	Dimensions (mm)			
	a	b	c	d
FAT 30B	104,2	88	126	48
FAT 30C	99	74	74,6	55
FAT 30	104,25	88	68,6	48
FAT 40	99	78	61,6	42
FAT 60	129	104	64	44
FAT 100	156	147	64	44
FAT 130	220	192	63,5	42

HARMONIC FILTERS, SHUNT REACTORS and LINE & LOAD REACTORS



General Features

According to filter power Thermal clamp or busbar connection in output
Production with three or single phases
Design with iron core, air gap
Heat protection with thermo contact
Copper or aluminum winding
Protection degree IP 00
F class isolation

Harmonic Filter:

Mono phase : 189Hz, Uk = 250V, 0,5 to 10 kVAr
 Three phase : 189Hz, Uk = 440V / 525V, 1 to 100 kVAr

Shunt Reactor:

Mono phase : 0,1 to 10 kVAr
 Three phase : 0,5 to 50 kVAr

Line & Load Reactor:

Mono phase : 0,37 to 4 kVAr
 Three phase : 0,37 to 160 kVAr

LINE & LOAD REACTORS

Power KW	Bus Voltage V	Width mm	Lenght mm	Depth mm	Weight kg.
Monophase					
0,37	230	84	85	50	1,5
0,55	230	84	85	55	1,7
0,75	230	84	85	60	1,9
1,1	230	96	110	70	2,9
1,5	230	96	110	75	3
2,2	230	96	110	80	3,2
3	230	96	110	90	3,5
4	230	96	110	100	4
Triphase					
0,37	400	145	150	90	2,00
0,55	400	145	150	90	2,20
0,75	400	145	150	90	2,20
1,1	400	145	150	90	2,20
1,5	400	145	150	100	3,05
2,2	400	145	150	100	3,20
3	400	145	150	110	3,40
4	400	180	180	110	5,00
5,5	400	180	180	115	5,50
7,5	400	180	180	115	5,70
11	400	200	180	115	7,00
15	400	200	180	120	7,30
18,5	400	200	180	125	7,80
22	400	200	180	130	8,00
30	400	240	230	125	11,00
37	400	240	230	135	11,70
45	400	240	230	145	12,00
55	400	265	240	150	17,00
75	400	265	240	165	17,00
90	400	300	280	170	23,00
110	400	300	280	195	24,00
132	400	300	280	200	25,00
160	400	360	320	205	30,00

HARMONIC FILTERS

Power (kVAr)	Bus Voltage (V)	Width (mm)	Lenght (mm)	Depth (mm)	Weight kg.
Monophase (P:%7 189 Hz / P: 5,67 210 Hz)					
0.5	230	84	95	50	1,30
1	230	84	95	60	1,40
1.5	230	84	95	100	1,55
2	230	120	120	90	2,50
2.5	230	120	120	90	2,50
5	230	133	130	75	3,80
7.5	230	150	150	80	5
10	230	170	150	90	5,50
Triphase (P:%7 189 Hz / P: 5,67 210 Hz)					
1	400	150	145	95	4,50
2	400	150	145	100	4,70
2.5	400	150	145	100	5,00
5	400	180	180	100	6,00
6.25	400	180	180	100	7,00
7.5	400	180	180	110	7,50
10	400	180	180	120	9,00
12.5	400	180	180	130	9,40
15	400	180	180	130	9,75
20	400	200	180	130	10,00
25	400	230	220	170	14,00
30	400	250	220	170	16,00
40	400	260	220	180	17,00
50	400	300	250	180	23,00
65	400	300	260	200	28,00
75	400	320	260	240	39,00
80	400	380	300	250	41,00
100	400	400	350	270	45,00

SHUNT REACTORS

Power (kVAr)	Inductance (mH)	Current (A)	Width (mm)	Length (mm)	Depth (mm)	Power (kVAr)	Inductance (mH)	Current (A)	Width (mm)	Length (mm)	Depth (mm)
Monophase						Triphase					
0.1	1697	0,43	85	90	80	0.5	1018	0,72	150	150	80
0.25	679	1,09	85	90	100	1	509	1,45	180	180	90
0.5	339	2,17	110	120	110	1.5	339	2,17	180	180	100
0.75	226	3,26	120	120	125	2	254	2,90	230	240	120
1	169	4,35	150	150	125	2.5	203	3,62	250	250	110
1.5	113	6,52	150	150	145	3	170	4,35	250	250	100
2	84,89	8,70	150	150	160	4	127	5,80	300	260	135
2.5	67,91	10,87	170	170	160	5	101	7,25	300	260	145
3	56,59	13,04	170	170	170	7.5	68	10,87	330	350	180
4	42,44	17,39	200	200	180	10	51	14,49	360	360	150
5	33,95	21,74	200	200	200	12.5	40,74	18,12	360	360	160
7.5	22,64	32,61	250	250	210	15	33,95	21,74	430	410	160
10	16,98	43,68	250	250	230	20	25,47	28,99	500	480	180
Stage						25	20,37	36,23	500	500	260
0,25-0,5-0,75	679-226	1,08-3,26	120	120	100	30	16,98	43,48	550	500	270
0,25-0,5-0,75-1	679-169	1,08-4,34	150	130	100	40	12,73	57,97	630	500	260
0,5-1-1,5	339-113	2,17-6,52	150	145	100	50	10,19	72,46	630	600	260

POWER CAPACITORS (IEC / EN 60831-1), (IEC / EN 60831-2)

Type	Phase	Power (kVAr)			Dimension Ø(D)xH (mm)	
		230V	415V	440V		
M Series Mono-Phase						
MKP technology						
	FEKM 0,4/0.81	1	0,25	0,81	0,91	63,5x87
	FEKM 0,4/1.63	1	0,50	1,63	1,83	63,5x87
	FEKM 0,4/3.26	1	1,00	3,26	3,66	63,5x87
	FEKM 0,4/4.88	1	1,50	4,88	5,49	63,5x145
	FEKM 0,4/8.14	1	2,50	8,14	9,15	63,5x145
	FEKM 0,4/16.28	1	5,00	16,28	18,30	76x210
K Series Three-Phase						
MKP technology						
	FEK13 0.44/0.6	3	0,5	0,54	0,61	63,5x87
	FEK13 0.44/1.2	3	1,0	1,08	1,21	63,5x87
	FEK13 0.44/1.8	3	1,5	1,61	1,81	63,5x95
	FEK13 0.44/3.1	3	2,5	2,69	3,03	63,5x95
	FEK13 0.44/6.1	3	5,0	5,38	6,05	76x175
	FEK13 0.44/9.1	3	7,5	8,07	9,08	76x175
	FEK13 0.44/12.1	3	10,0	10,76	12,10	76x210
	FEK13 0.44/15.1	3	12,5	13,46	15,13	85x210
	FEK13 0.44/18.2	3	15,0	16,15	18,16	85x210
	FEK13 0.44/24.2	3	20,0	21,53	24,20	95x210
	FEK13 0.44/30.3	3	25,0	26,91	30,25	95x247
	FEK13 0.44/36.3	3	30,0	32,29	36,30	116x247
	□ = 400V for A, 440V for D enter value.					
480V 525V						
	FEK13 0.52/10	3	10,0	11,96		76x210
	FEK13 0.52/15	3	15,0	17,94		95x210
	FEK13 0.52/20	3	20,0	23,93		95x247
	FEK13 0.52/25	3	25,0	29,91		116x247

REACTIVE POWER CONTROL RELAYS (IEC / EN 60255)



Auto correct for current and voltage connection faults
 Step information due to loading
 Adjustable measurement interval between 10-100 ms
 Reactive correction at 20 ms.
 Feature of static contactor driving.
 Monophase, two-phase or three-phase capacitor or reactor connection feature into all steps.

Measurement class CL: 0,5
 Remote controlling step by step
 Power measurement with 32 byte sensitivity.
 Compensation feature at low currents (3 mA)
 Harmonic distortion measurement of current and voltage between 1-31
 LCD display

Type	Step of relay	Step of thyristor	SVC outs	Alphanumeric screen	Graphic screen	RS-485	GPRS modem	e-posta	sms	Dimensions
FRR 10-08	8	-	-	-	-	-	-	-	-	96x96
FRR 12-12	12	-	✓	✓	-	✓	-	-	-	144x144
FRR 15-12U	12	-	-	-	-	✓	-	-	-	144x144
FRR 15-15	15	-	-	-	-	✓	-	-	-	144x144
FRR 24-12	12	-	✓	-	✓	✓	-	-	-	144x144
FRR 24-12C	12	-	✓	-	✓	✓	-	-	✓	144x144
FRR 24-18	18	-	✓	-	✓	✓	-	-	-	144x144
FRR 24-18C	18	-	✓	-	✓	✓	-	-	✓	144x144
FRR 24-24	24	-	✓	-	✓	✓	-	-	-	144x144
FRR 24-24C	24	-	✓	-	✓	✓	-	-	✓	144x144
FRR 24-12M	12	-	✓	-	✓	✓	✓	✓	✓	144x144
FRR 24-18M	18	-	✓	-	✓	✓	✓	✓	✓	144x144
FRR 24-24M	24	-	✓	-	✓	✓	✓	✓	✓	144x144
FRR 24-12T	12	-	✓	-	✓	✓	-	-	-	144x144
FRR 24-24T	24	-	✓	-	✓	✓	-	-	-	144x144
FRR 24-12RT	12	-	✓	-	✓	✓	-	-	-	144x144
FRR 24-TFT-4,3"-12R	12	-	✓	-	✓	✓	-	-	-	144x144
FRR 24-TFT-4,3"-12RC	12	-	✓	-	✓	✓	-	-	✓	144x144

STATIC CONTACTORS



Type	FSC 05	FSC 10	FSC 15	FSC 30	FSC 50	FSC 100
Rated power (kVAr)	5	10	16	30	50	100
Rated voltage (V)	230 / 400	230 / 400	230 / 400	230 / 400	230 / 400	230 / 400
Rated current (A)	3x8	3x16	3x24	3x50	2x80	2x160
Number of switches	3	3	3	3	2	2
Max. working temperature	55°C	55°C	55°C	55°C	55°C	55°C
Control Input	DC 10 - 28V	DC 10 - 28V	DC 10 - 28V	DC 10 - 28V	DC 10 - 28V	DC 10 - 28V
Automatic fan	-	✓	✓	✓	✓	✓
Temperature protection	✓	✓	✓	✓	✓	✓
Dimensions (mm)	120x100x115	115x170x140	115x170x140	115x250x160	115x250x160	125x250x220
Weight (kg)	1,0	1,7	1,7	3,25	3,25	7,5

DRIVERS (IEC / EN 61954)



Type	FVC 05	FVC 10	FVC 20	FVC 30
Rated power (kVAr)	5	10	20	30
Rated voltage (V)	230 / 400	230 / 400	230 / 400	230 / 400
Rated current (A)	8	16	30	50
Phase	3	3	3	3
Reactor rating (kVAr)	3x1,7	3x3,4	3x6,7	3x10
Max. working temperature	55°C	55°C	55°C	55°C
Automatic fan	-	✓	✓	✓
Temperature protection	✓	✓	✓	✓
Weight (kg)	1,0	1,7	1,7	3,25

POWER ANALYZER (IEC / EN 61010-1)



- True RMS measurement
- Harmonic distortion indication
- Maximum demand indication
- Energy pulse out
- VT ratio for MV applications
- Lower depth panel requirement
- LCD display

Type	FPA140	FPA140P	FPA140P-AC	FPA140P-DC	FPA160
B&W Screen (2,9")	✓	✓	✓	✓	-
Color Screen (3,5")	-	-	-	-	✓
RS-485 Modbus	✓	✓	✓	✓	✓
Digital Inputs	2	4	4	4	2
Digital Outputs	2	2	2	2	2
Analog Outputs	-	2	3	3	-
USB Port	-	✓	✓	✓	✓
Gound Current Input	-	✓	-	-	-
DC Supply	-	-	-	✓	-
1 mA Measurement	✓	✓	✓	-	✓
Record Memory	-	1 mb.	1 mb.	1 mb.	-
Real Time Clock	-	✓	✓	✓	✓
Accuracy %	0,5	0,5	0,5	0,5	0,2
True RMS	✓	✓	✓	✓	✓
Harmonic	31	31	49	49	63
Micro-SD Kart	-	✓	-	-	✓
Ethernet	-	-	-	-	✓
USB Host	-	-	-	-	✓
External GPRS Modem	-	-	-	-	✓

RELAYS

Type	Description
Under Over Voltage Protection Relays User Guide	
FMPR	Under Over Voltage Protection Relays User Guide
Phase Protection Relays	
FMFK	Phase Sequency and Motor Protection (adjustable)
MTPR1	Phase Protection
FSMK	Phase Sequency and Motor Protection
Liquid Level Relay	
FSSR	Liquid Level Relay
Time Relays	
FT30	0-30 sec.
Digital Thermostats	
FDT72	72x72
FDT96	96x96
Microprocess Counters	
FS72	72x72



ANALOGUE MEASUREMENT DEVICES

	Ammeters		Max. Demand Ammeters		Voltmeters		Frequencymeters	
Type	FA 72	FA 96	FMA 72	FMA 96	FV 72	FV 96	FF 72	FF 96
Measurement wave form	AC (r.m.s)		AC (r.m.s)		AC (r.m.s)		AC (r.m.s)	
Measuring range	From 10A to 100A (direct) From 30/5A to 4000/5A (current trans)		From 200/5A to 4000/5A with current trans. (15min)		250 V ve 500 V		45 - 65Hz 55 - 65Hz	
Accuracy class	1.5		3		1.5		1.5	
Operating method	Moving iron		Bimetal		Moving iron		Moving coil	
Operating frequency	45 - 65 Hz		45 - 65 Hz		45 - 65 Hz		45 - 55 Hz	
Continuously overload (2hour)	1.2 x In		1.2 x In		1.2 x Un		1,2 x Un, 1,2 x 55 Hz	
Short-time overload	10 x In		10 x In		2 x Un		2 x Un	
Consumption (max.)	1 VA		2.2 VA		3 VA		1 VA	
Insulation testing voltage	2000 V		2000 V		2000 V		2000 V	
Operating position	Scale vertical position		Scale vertical position		Scale vertical position		Scale vertical position	
Dimensions	72 X 72	96 X 96	72 X 72	96 X 96	72 X 72	96 X 96	72 X 72	96 X 96

DIGITAL MEASUREMENT DEVICES (IEC / EN 61010-1)

	Ammeter	Ammeter (with 2 relay)	Voltmeter	Voltmeter with 2 relay)	Multimeter	
Type	FYA72 - FYA72 - 200 FYA96 - FYA96 - 200	FYA96 - 2R FYA96 - 2R 200	FYV72 - FYV96	FYV96 - 2R	FMM50 - FMM50R	
Measurement wave form	AC (rms)		AC (rms)	AC (rms)	AC (rms)	
Measurement Range	0-5A MAX.6A direct (FYA72, 96) 0-9999A with Current Transformers (FYA72, 96) 0-200A MAX.250A direct (FYA72, 96 - 200)		0-500V AC MAX.600V AC 0-36kV AC with voltage transformer		0-500V AC MAX.600V AC 0-36kV AC with voltage transformer 0-9999A with Current Transformers	
Accuracy class	1	1	1	1	1	
Operating frequency	0 / 50 ... 60 Hz		0 / 50 ... 60 Hz	0 / 50 ... 60 Hz	0 / 50 ... 60 Hz	
Operating temperature	-40°C ... +85°C		-40°C ... +85°C	-40°C ... +85°C	-40°C ... +85°C	
Feeding voltage	85 ... 265V AC 10 ... 300V DC		85 ... 265V AC 10 ... 300V DC	85 ... 265V AC 10 ... 300V DC	85 ... 265V AC 10 ... 350V DC	
Dimensions	72 x 72 / 96 x 96		96 x 96	72 x 72 / 96 x 96	96 x 96	96 x 96

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CAM SWITCHES (IEC / EN 60947-3)



	FCS1				FCS2		Number of pole
	10	16	20	25	32	63	
Rating (A)	10	16	20	25	32	63	
On-Off Switches	✓	✓	✓	✓	✓	✓	1, 2, 3, 3+1
Changeover Switches	✓	✓	✓	✓	✓	✓	1, 3
Star Delta Starters		✓		✓			3
Motor Reversing Switches	✓	✓	✓	✓			1, 3
Voltmeter Switches			✓				4, 7
Ammeter Switches			✓				3
Safety Switches			✓		✓	✓	3

CYLINDRICAL FUSES (IEC / EN 60269)



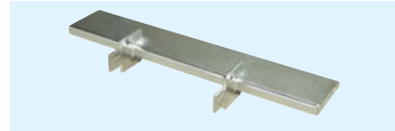
Type	Dimensions mmxmm	Rated Voltage U_n (V AC)	Rated Current I_n (A)
FCF10-38	10x38	500	2
FCF10-38	10x38	500	4
FCF10-38	10x38	500	6
FCF10-38	10x38	500	8
FCF10-38	10x38	500	10
FCF10-38	10x38	500	12
FCF10-38	10x38	500	16
FCF10-38	10x38	500	20
FCF10-38	10x38	500	25
FCF14-51	14x51	500	2
FCF14-51	14x51	500	4
FCF14-51	14x51	500	6
FCF14-51	14x51	500	8
FCF14-51	14x51	500	10
FCF14-51	14x51	500	16
FCF14-51	14x51	500	20
FCF14-51	14x51	500	25
FCF14-51	14x51	500	32
FCF14-51	14x51	500	40
FCF14-51	14x51	500	50
FCF22-58	22x58	500	10
FCF22-58	22x58	500	16
FCF22-58	22x58	500	20
FCF22-58	22x58	500	25
FCF22-58	22x58	500	32
FCF22-58	22x58	500	40
FCF22-58	22x58	500	50
FCF22-58	22x58	500	63
FCF22-58	22x58	500	80
FCF22-58	22x58	500	100

CYLINDRICAL FUSE BASES









Type	Dimensions mmxmm	Number of Pole	Rated Current I_n (A)
FCFB10-38	10x38	1	25
FCFB10-38	10x38	1+N	25
FCFB10-38	10x38	3	25
FCFB14-51	14x51	1	50
FCFB14-51	14x51	1+N	50
FCFB14-51	14x51	3	50
FCFB22-58	22x58	1	100
FCFB22-58	22x58	1+N	100
FCFB22-58	22x58	3	100
FCFB22-58	22x58	3+N	100

SOLID LINKS







Solid Link is used by NH Fuses for direct connection of contacts without fuse link. It's non-isolated type. NH00 - NH1 - NH2 - NH3

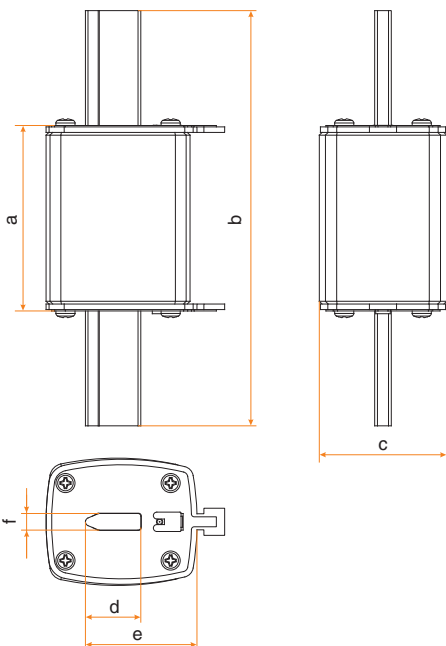
NH (H.R.C.) FUSES (Single and Dual Indicators) (IEC / EN 60269-1)

						
Type	NH00	NH0	NH1	NH2	NH3	NH4
Rated current In(A)	4 - 160	25 - 160	32 - 250	63 - 400	125 - 630	800 - 1250
Rated short circuit breaking capacity (kA) (380V)	120	120	120	120	120	120
Rated Voltage (V)	500	500	500	500	500	500
Rated Insulation Level (V)	690	690	690	690	690	690
Rated operating frequency (Hz)	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Utilization category	gG	gG	gG	gG	gG	gG
Indicator	Single / Dual	Single / Dual	Single / Dual	Single / Dual	Single / Dual	Single / Dual

Compact Type NH Fuses

						
Type	NHC00	NHC1	NHC2	NHC00	NHC1	NHC2
Rated current In(A)	4 - 100	25 - 160	32 - 250	6 - 100	25 - 160	40 - 250
Rated short circuit breaking capacity (kA) (380V)	120	120	120	120	120	120
Dimensions	000	1/0	2/1	000	1/0	2/1
Rated Voltage (V)	500	500	500	500	500	500
Rated Insulation Level (V)	690	690	690	690	690	690
Rated operating frequency (Hz)	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Utilization category	gG	gG	gG	gG	gG	gG
Indicator	Single	Single	Single	Dual	Dual	Dual

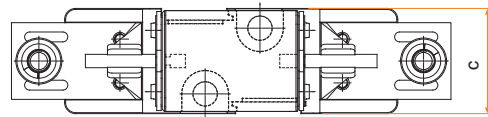
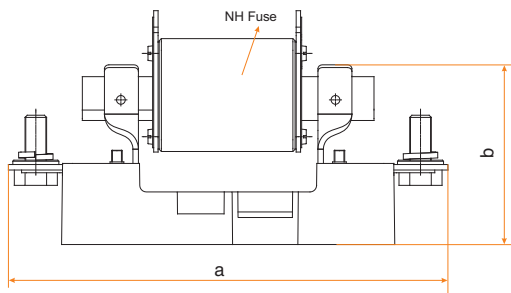
Note: Materials of NH00-NH1-NH2 fuse knives is brass as a standard. NH3 types fuse knives produced from copper as a standard. Upon customer request knives can be produced from copper alternatively.



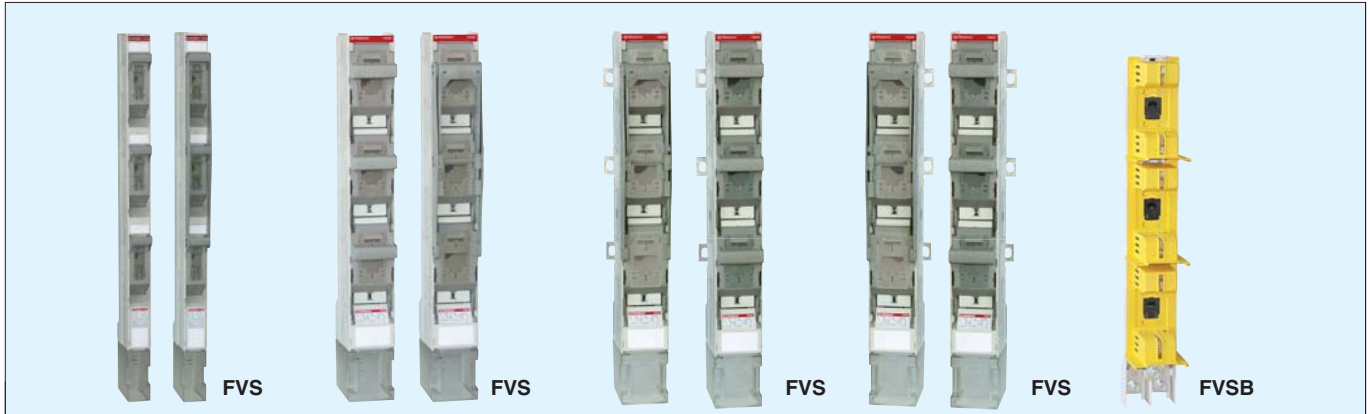
Type	Dimensions (mm)					
	a	b	c	d	e	f
NH00	50	78,5 ±1.5	29,5	15	35	6
NHC00	49	78,5 ±1.5	21	15	35	6
NH0	68	125 ±2.5	29,5	15	35	6
NH1	68	135 ±2.5	46	20	40	6
NHC1	68	135 ±2.5	29,5	15	35	6
NH2	68	150 ±2.5	59	25	48	6
NHC2	68	150 ±2.5	46	20	40	6
NH3	68	150 ±2.5	69,5	32	60	6
NH4	76	200 ±3	86	50	74	8

NH FUSE BASES (BMC / STEATIT) (IEC / EN 60269-1)

Type	NH00	NH0	NH1	NH2	NH3	NH4
Rated current I _n (A)	6 - 160	25 - 160	40 - 250	63 - 400	125 - 630	800 - 1250
Rated short circuit breaking capacity (kA) (380V)	120	120	120	120	120	120
Rated Voltage (V)	500	500	500	500	500	500
Rated Insulation Level (V)	690	690	690	690	690	690
Rated operating frequency (Hz)	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Utilization category	gG	gG	gG	gG	gG	gG



Type	Dimensions (mm)		
	a	b	c
NH00	120	54	32,5
NH0	170	64,5	32
NH1	200	82	47,5
NH2	225	88	47,5
NH3	240	99	47,5
NH4	309	134,5	87

FUSE SWITCH DISCONNECTORS (IEC / EN 60947-3)

Technical Features:

Type		FVS160	FVS250 / FVSB250	FVS400 / FVSB400	FVS630 / FVSB630
Conventional thermal current (I _{th})	A	160	250	400	630
Number of poles		3	3	3	3
Insulation voltage (U _i)	V	1000	1000	1000	1000
Impulse withstand voltage (U _{imp})	kV	8	8	8	8
Frequency	Hz	50- 60	50- 60	50- 60	50- 60
Operational voltage (U _e) (phase-phase)	V	400/500/690	400/500/690	400/500/690	400/500/690
Utilization category		AC23B/AC22B/AC21B	AC23B/AC22B/AC21B	AC23B/AC22B/AC21B	AC22B/AC22B/AC21B
Operational current (I _e)	A	160	250	400	630
Conditional short-circuit current (NH Fuse) kA		85	85	85	70
Fuse type	NH	000 - 00	1 - 2	1 - 2 - 3	1 - 2 - 3
Mechanical durability	operation	> 30000	> 20000 / -	> 20000 / -	> 20000 / -
Electrical durability	operation	200	200	200	200
Connection conductor cross-section	mm ²	70	120	240	2x185
Power loss per pole	W	9	11	19	36
Max- Min tightening torques	Nm	7..10	14..20	17..25	28..40
Hole diameter	∅	M8	M10	M10	M12
Distance between main busbar terminals	mm	185	185/210	185/210	185/210
Weight	kg	2,4	5,6 / 3,2	5,6 / 3,2	6,9 / 4,3
Protection Degree		IP20	IP20	IP20	IP20

FVS 800A : 2 Pcs 400A FVS Vertical Switch fuses are parallel connected.

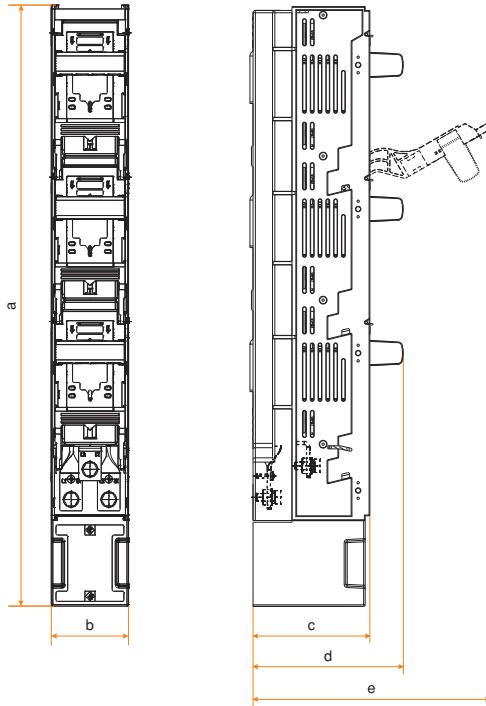
FVS 1000A : 2 Pcs 630A FVS Vertical Switch fuses are parallel connected.

FVS 1250A : 2 Pcs 630A FVS Vertical Switch fuses are parallel connected.

FVS 800 - FVS 1000 - FVS 1250
 (800A - 1000A - 1250A)

Accessories


FUSE SWITCH DISCONNECTORS (IEC / EN 60947-3)

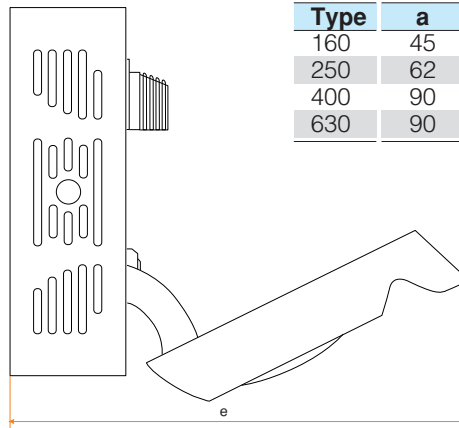
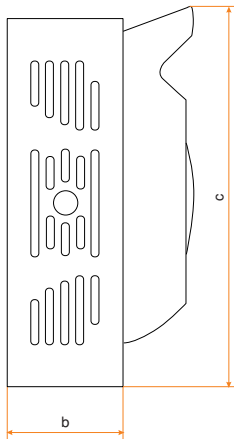
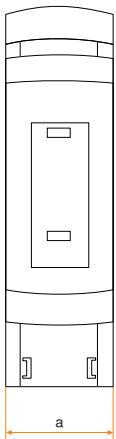


Type	Dimensions (mm)				
	a	b	c	d	e
FVS160 (With three separate handle)	765	49	126	137	205
FVS160 (With one handle)	765	49	126	147	212
FVS250 / FVS400 / FVS630 (With three separate handle)	770	99	150	197	308
FVS250 / FVS400 / FVS630 (With one handle)	770	99	150	204	457
FVSB250 / FVSB400 / FVSB630	668	99	150	-	-

FUSE SWITCH DISCONNECTORS (IEC / EN 60947-3)



		FHS1 160	FHS1 250	FHS1 400	FHS1 630
Conventional thermal current (I _{th})	A	160	250	400	630
Number of poles		1	1	1	1
Insulation voltage (U _i)	V	750	750	750	750
Impulse withstand voltage (U _{imp})	kV	8	8	8	8
Frequency	Hz	50- 60	50- 60	50- 60	50- 60
Operational voltage (U _e) (phase-neutral)	V	240/290/400	240/290/400	240/290/400	240/290/400
Utilization category		AC22B/AC22B/AC21B	AC22B/AC22B/AC21B	AC22B/AC22B/AC21B	AC22B/AC22B/AC21B
Operational current (I _e)	A	160	250	400	630
Conditional short-circuit current (NH Fuse) kA		65	65	65	65
Fuse type	NH	00 - 000	1 - 2	1 - 2 - 3	1 - 2 - 3
Mechanical durability	operation	> 30000	> 20000	> 20000	> 20000
Electrical durability	operation	200	200	200	200
Connection conductor cross-section	mm ²	70	120	240	2x185
Power loss per pole	W	4	8	14	25
Max- Min tightening torques	Nm	5..8	14..20	17..25	28..40
Hole diameter	Ø	M6	M10	M10	M12
Weight	kg	0,29	0,74	1,27	1,49
Protection Degree		IP20	IP20	IP20	IP20



Type	a	b	c	d
160	45	47	185	90
250	62	68	247	115
400	90	87	280	140
630	90	87	280	140

FUSE SWITCH DISCONNECTORS (IEC / EN 60947-3)

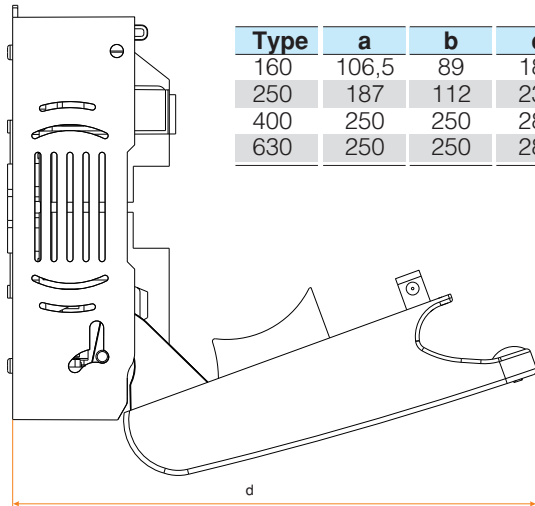
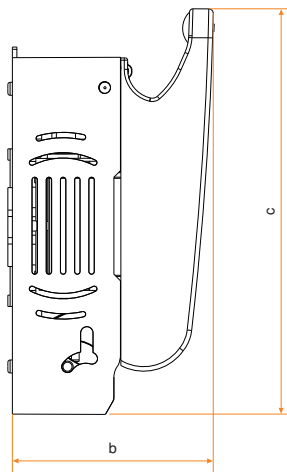
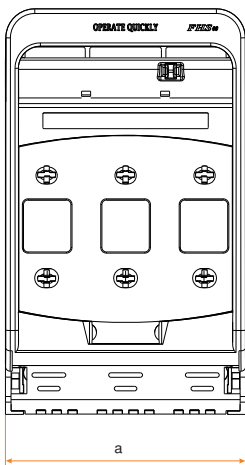


		FHS 160			FHS 250			FHS 400			FHS 630		
Conventional thermal current (Ith)	A	160			250			400			630		
Number of poles		3			3			3			3		
Insulation voltage (Ui)	V	750			750			750			750		
Impulse withstand voltage (Uimp)	kV	8			8			8			8		
Frequency	Hz	50- 60			50- 60			50- 60			50- 60		
Operational voltage (Ue) (phase-phase)	V	400	500	690	415	500	690	415	500	690	415	500	690
Utilization category		AC23B	AC22B	AC21B	AC22B	AC22B	AC21B	AC22B	AC22B	AC21B	AC22B	AC22B	AC21B
Operational current (Ie)	A	160	160	125	250	250	200	400	400	315	630	630	500
Conditional short-circuit current (NH Fuse) kA		70	70	70	70	70	70	70	70	70	70	70	70
Fuse type	NH	00-000			1 - 2			1 - 2 - 3			1 - 2 - 3		
Mechanical durability	operation	>20000			> 20000			> 20000			> 20000		
Electrical durability	operation	200			200			200			200		
Connection conductor cross-section	mm ²	70			120			240			2x185		
Power loss per pole	W	4			8			14			25		
Max- Min tightening torques	Nm	7..10			14..20			17..25			28..40		
Hole diameter	∅	M8			M10			M10			M12		
Weight	kg	0,70			1,51			3,27			3,85		
Protection Degree		IP20			IP20			IP20			IP20		

Accessories



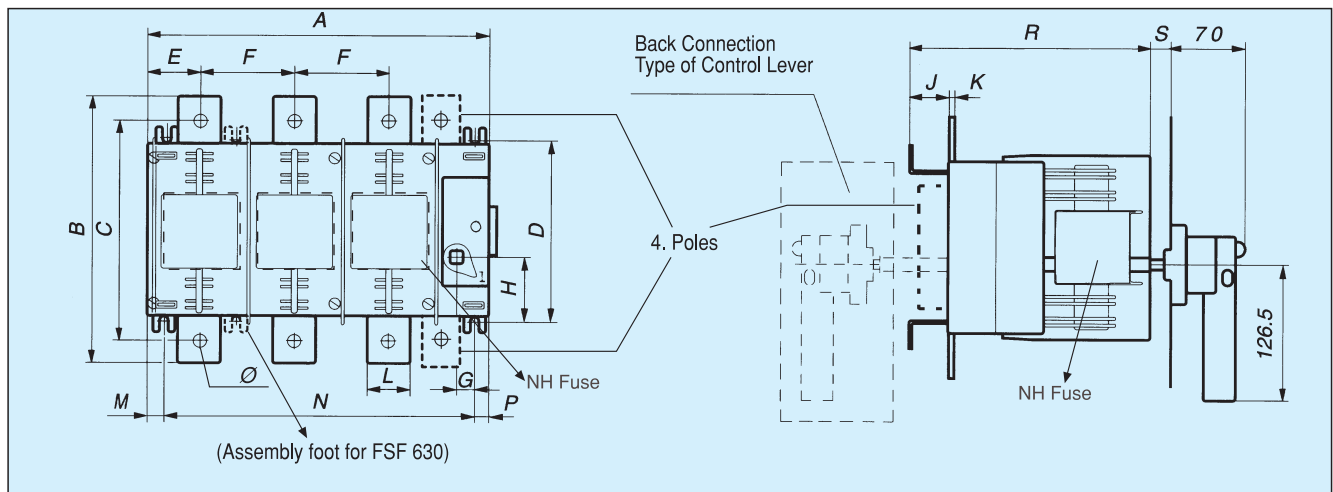
Connection Type



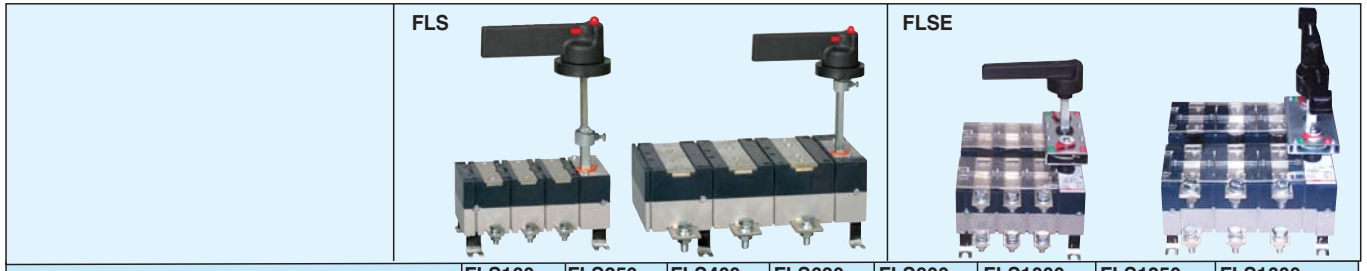
Type	a	b	c	d
160	106,5	89	180	205,7
250	187	112	238	285
400	250	250	285	340
630	250	250	285	340

LOAD BREAK SWITCH WITH / WITHOUT FUSES / CHANGEOVER ISOLATION SWITCH (IEC / EN 60947-3)

TYPE	FSF			
	FSF 160	FSF 250	FSF 400	FSF 630
Number of Poles	3, 4	3, 4	3, 4	3, 4
Utilization Category	AC 23A	AC 23A	AC 23A	AC 23A
Rated Thermal Current (I _{th})	A	160	250	400
Rated Insulation Voltage (U _i)	V	1000	1000	1000
Rated Impulse Withstand Voltage (U _{imp})	kV	8	8	8
Rated Frequency	Hz	50-60	50-60	50-60
Rated Operating Power	380V kW	75	132	200
	500V kW	100	160	280
	690V kW	120	220	360
Capacitor Power	380V kVAr	76	140	220
Rated Breaking Capacity	AC 23 A	8xI _n	8xI _n	8xI _n
Rated Closing Capacity	AC 23 A	10xI _n	10xI _n	10xI _n
Short Circuit Breaking Capacity with Fuse	kA _{rms}	65	65	65
Fuse Type (dispatched without fuse)	NH	00	1	2
Mechanical Life	Operation	10000	10000	10000
Electrical Life	Operation	1000	1000	1000
Weight	kg.	2.7	4.7	4.8
Maximum - Minimum Tightening Torque	Nm	8-10	19-25	19-25
Power Loss per Pole	W	10	13	27
Connection Conductive Section	mm ²	70	120	240
Protection Degree		IP20	IP20	IP20

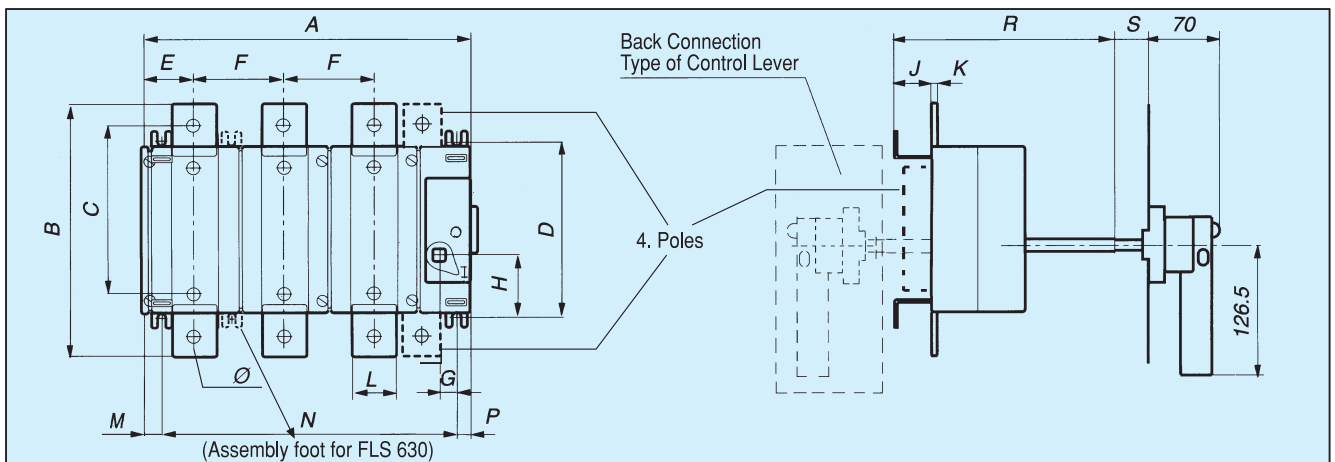
Load Break Switch With Fuse:


Type	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	Ø
FSF 160	185	142	123	105,5	37	43,5	15	32	28	3	20	13	160	12	152	10-70	8
FSF 250	255,5	163	138,5	128	43,5	65	15,5	33	32	4	25	15	224	20,5	197		11
FSF 400											30						
FSF 630	317	243	202	168	50	89	16,5	54	37	6	40	83,5	224	14	222,5	13	



TYPE		FLS160 FLS160E	FLS250 FLS250E	FLS400 FLS400E	FLS630 FLS630E	FLS800 FLS800E	FLS1000 FLS1000E	FLS1250 FLS1250E	FLS1600 FLS1600E
Number of Poles		3,4	3,4	3,4	3,4	3	3	3	3
Utilization Category	Load break switch	AC 23A	AC 23A	AC 23A	AC 23A	AC 22A	AC 22A	AC 21A	AC 21B
	Changeover	AC 22A	AC 22A	AC 22A	AC 22A	AC 22A	AC 22A	AC 21A	AC 21B
Rated Thermal Class	A	160	250	400	630	800	1000	1250	1600
Rated Insulation Voltage (Ui)	V	1000	1000	1000	1000	1000	1000	1000	1000
Rated Impulse Withstand Voltage (Uimp)	kV	8	8	8	8	8	8	8	8
Rated Frequency	Hz	50-60	50-60	50-60	50-60	50-60	50-60	50-60	50-60
Rated Operating Power	380V kW	75	132	200	320	-	-	-	-
	500V kW	100	160	280	340	-	-	-	-
	690V kW	120	220	360	400	-	-	-	-
Capacitor Power	380V kVAr	76	140	220	300	-	-	-	-
Rated Breaking Capacity	A	8xIn	8xIn	8xIn	5xIn	3xIn	3xIn	1,5xIn	1,5xIn
Rated Closing Capacity	A	10xIn	10xIn	10xIn	10xIn	3xIn	3xIn	1,5xIn	1,5xIn
Short Circuit Breaking Capacity with Fuse	kA _{rms}	65	65	65	65	65	65	65	65
Short Time Withstand Current	kA/1s	8	15	15	25	35	35	35	35
Mechanical Life	Operation	10000	10000	10000	8000	8000	8000	8000	8000
Electrical Life	Operation	1000	1000	1000	1000	500	500	500	200
Weight	kg.	2,6 / 6	4,4 / 7	4,5 / 10	8,5 / 12	9 / 20	9 / 22	9 / 25	9 / 29
Minimum - Maximum Tightening Torque	Nm	8-10	19-25	19-25	30-40	30-40	30-40	30-40	30-40
Power Loss per Pole	W	9	12	25	47	54	70	100	145
Connection Conductive Section	mm ²	70	120	240	2x185	40x12	40x15	2x(40x10)	2x(50x10)
Protection Degree		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20

Load Break Switch Without Fuse:



Tip	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	Ø
FLS 160	185	142	123	105,5	37	43.5	15	32	28	3	20	13	160	12	152	10-70	8
FLS 250	255.5	163	138.5	128	43.5	65	15.5	33	32	4	25	15	224	20.5	197		11
FLS 400											30						
FLS 630	317	355	315	168	50	89	16.5	54	37	6	40	83.5	224	14	222.5	13	
FLS 800									35	8							
FLS1000									33	10							
FLS1250									31	12							
FLS1600																	

FIBER GLASS REINFORCED POLYESTER CABINETS (IEC/EN 61439-1)

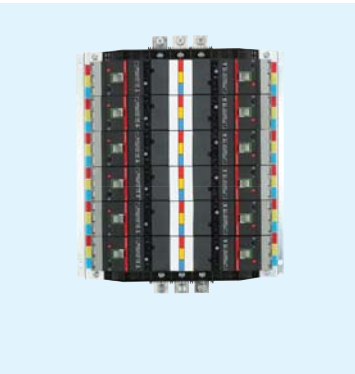
Technical Specifications

	Type-1	Type-3
Width	585	790
Height	880	880
Depth	320	320
Base Length	900	900
IP Protection	IP54	IP54
Total weight (kg)	37	45
RAL	7035	7035

EasyPan DISTRIBUTION BOARDS (IEC / EN 61439-1, IEC/EN 61439-3)

Technical Specifications

IP Protection	: IP40
Thickness	: 1,00 mm
Number of ways	: 12 - 18 - 24 - 30 - 36
Input Circuit	: L.V. Circuit Breakers Residual Current Circuit Breakers Miniature Circuit Breakers Disconnectors
Standard	: IEC 60439-1

EasyPan READY BUSBAR SYSTEMS


- 250 A, 400A ve 630A main switch connection means
- 2, 4, 6, 10, 12 path (3 pole) Federal F10, F11, F31 type switch output means
- Conformity with IEC 60439-1 and CE norms
- Easy and reliable maintenance
- Aesthetic appearance
- Completely equipped
- Dispatch in optional panel
- Direct connection without main switch
- Phases shown with colored labels
- Barehand contact has been prevented in compliance with IP20 protection degree according to IEC standards and ensured complete life security.

MODULAR MAIN DISTRIBUTION PANEL BOARDS (IEC / EN 61439-1) (IEC / EN 61439-2)

Electrical characteristics of federal panel

Current Capacity	: 2500 A
Rated Voltage	: 415 V
Isolated Voltage	: 1000 V
Impact Resistance Voltage	: 8kV
Peak Resistance Voltage	: 143kApk
Short Period Resistance Current	: 65kArms
Usage Factor	: 1
Protection Degree	: IP54
Formatting	: Form 4b
Standard	: IEC 61439-1 and IEC 61439-2

Type : Type1, Type2, Type3
Type4, Type5, Type6

NATURAL GAS METER (EN 1359)

Type	FN G2.5 FN G2.5-HT	FN G4 FN G4-HT	FN G6
Gas Types	Natural Gas - Air Gas		
Q Min	0.025m ³ / h	0.04m ³ / h	0.06m ³ / h
Q Max	4m ³ / h	6m ³ / h	10m ³ / h
Measuring Interval	0.025m ³ /h - 4m ³ /h	0.040m ³ /h - 6m ³ /h	0.06m ³ /h - 10m ³ /h
Max. Operating Pressure	0.5 bar		
Leakage Test Pressure Value	750 mbar		
Measuring Volume	1.2 dm ³		2.2 dm ³
Operating Temperature	-25 C°, +55 C°		
Storage Temperature	-30 C°, +70 C°		
Body	Galvanized 0,8mm Deep Extrusion Steel		Deep Drawing Sheet Iron
Weight	2 kg.		3 kg.

- Connection points; manufactured as two outlet fittings
- As inner volume of 1.2 dm³ suits best to operating conditions, it can operate in optimal rates during high haulage.

ELECTRONIC BALLASTS

Professional Electronic Ballasts

	Type	Power (W)
	T5 Class	
	FDR5-FDH-1/LW	1x4, 6, 8, 13
	FDR5-FDH-2/LW	2x4, 6, 8, 13
	FDR5-FDH-1/MW	1x14, 21, 28, 35
	FDR5-FDH-2/MW	2x14, 21, 28, 35
	FDR5-FDH-4/14	4x14
	T8 Class	
	FDR8-FDH-1/15	1x15
	FDR8-FDH-2/15	2x15
	FDR8-FDH-1/18	1x18
	FDR8-FDH-2/18	2x18
	FDR8-FDH-3/18	3x18
	FDR8-FDH-4/18	4x18
	FDR8-FDH-1/30	1x30
	FDR8-FDH-2/30	2x30
	FDR8-FDH-1/36	1x36
	FDR8-FDH-2/36	2x36
	FDR8-FDH-3/36	3x36
	FDR8-FDH-1/58	1x58
	FDR8-FDH-2/58	2x58
	TC-L Class	
	FDRL-FSD-1/MW	1x18, 24
	FDRL-FSD-2/MW	2x18, 24
	FDRL-FSD-1/36	1x36
	FDRL-FSD-2/36	2x36
	FDRL-FSD-3/36	3x36
	FDRL-FSD-1/40	1x40
	FDRL-FSD-2/40	2x40
	FDRL-FSD-1/55	1x55
	FDRL-FSD-2/55	2x55
	TC- DEL Class	
	FDRC-FSM-1/MW	1x10, 13, 18
	FDRC-FSM-2/MW	2x10, 13, 18
	FDRC-FSM-1/26	1x26
	TR- DEL UV Class	
	FDRZ-UVL-1/21	1x21
FDRZ-UVL-1/40	1x40	

Basic Electronic Ballasts

	Type	Power (W)
	T8 Class	
	FDR8-BSC-1/15	1x15
	FDR8-BSC-2/15	2x15
FDR8-BSC-1/18	1x18	
	T5 Class	
	FDR5-BSC-1/LW	1x4,6,8,13
	FDR5-BSC-2/LW	2x4,6,8,13
	FDR5-BSC-1/MW	1x14,21
FDR5-BSC-1/24	1x24	
	T5C Class	
FDR5-BSC-1/22	1x22	
	TC-L Class	
FDRL-BSC-1/MW	1x18,24	
	TC-DEL Class	
	FDRC-BSC-1/MW	1x10,13,18
	FDRC-BSC-2/MW	2x10,13,18
FDRC-BSC-1/26	1x26	
	TC-SEL Class	
	FDRS-BSC-1/MW	1x5,7,9,11
FDRS-BSC-2/MW	2x5,7,9,11	
	TC-TEL Class	
FDRT-BSC-1/26	1x26	
	TC-F Class	
FDRF-BSC-1/MW	1x18,24	
	TC-DD Class	
	FDRD-BSC-1/MW	1x10,16
FDRD-BSC-2/10	2x10	

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