



Contactor Technical Competitive Comparison

Product : AC Contactor 9A - Applicable Standard IS/IEC 60947-4-1


No.	Parameters	Unit	 T Range	Schneider Electric		Siemens		ABB		GE
			TC1D09	LC1-D09	Tesys E	LC1E09	3TF	3TR	A LINE	B LINE
1	Product Reference	Unit	TC1D09	LC1-D09	LC1E09	3TF30	3TR30	A9	B9	CL00
2	Frame Size (width in mm)	MM	45	45	45	45	45	44	45	45
3	Permissible/Operational Ambient Temperature	Degree C	-5 to +55	-5 to +55	-5 to +55	-25 to +55	-25 to +60	-25 to +55		n/a
4	Number of Poles (Power)	No's	3	3	3	3	3	3		3
5	Rated Insulation Voltage (Ui)	V	1000	690	690	690	690	1000	690	1000
6	Rated Operational Voltage (Ue)	V	690	690	690	690	690	690	690	690
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	25	25	25	21	20	26	20	25
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	9	9	9	9	9	9	9	9
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	4	4	4	4	4	4		4
11	Rated Making Current	A	250	250	90	n/a	n/a	90	300	450
12	Rated Breaking Current	A	250	250	72	n/a	n/a	72	200	250
13	Mechanical Life (x10 ⁶ Operations)	No's	20	20	10	15	15	10	10	15
14	Electrical Life (x10 ⁶ Operations)	No's	2.1	1.8	1.4	1.4	2.4	2.1	1	2
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1800	1000	1000	1200	6000	1200
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°	±30°	±30°
17	Coil Consumption (AC 50 Hz)									
	Inrush	VA	60	70	95	68	68	70	65	48
	Sealed	VA	7.5	7.5	8.5	10	10	8	9	6
18	Accessories									
	Add On Block	Front Mounted	●	●	●	●	●	●	●	●
		Side Mounted	●	●	x	●	●	●	●	●
	Pneumatic Timers	ON/OFF Delay	●	●	x	●	●	●	●	●
		Star Delta	●	●	x	●	●	●	●	●
	Coil Suppressor		●	●	●	●	●	●	●	●
	Mechanical Interlock		●	●	●	●	●	●	●	●

Product : AC Contactor 12A - Applicable Standard IS/IEC 60947-4-1


No.	Parameters	Unit	 T Range	Schneider Electric		Siemens		ABB		GE
			TC1D12	LC1-D12	Tesys E	LC1E12	3TF	3TR	A LINE	B LINE
1	Product Reference	Unit	TC1D12	LC1-D12	LC1E12	3TF31	3TR31	A12	B12	CL01
2	Frame Size (width in mm)	MM	45	45	45	45	45	44	45	45
3	Permissible/Operational Ambient Temperature	Degree C	-5 to +55	-5 to +55	-5 to +55	-25 to +55	-25 to +60	-25 to +55		n/a
4	Number of Poles (Power)	No's	3	3	3	3	3	3		3
5	Rated Insulation Voltage (Ui)	V	1000	690	690	690	690	1000	690	1000
6	Rated Operational Voltage (Ue)	V	690	690	690	690	690	690	690	690
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	25	25	25	20	20	28	22	25
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	12	12	12	12	12	12	12	12
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	5.5	5.5	5.5	5.5	5.5	5.5		5.5
11	Rated Making Current	A	250	250	120	n/a	n/a	120	300	450
12	Rated Breaking Current	A	250	250	96	n/a	n/a	96	200	250
13	Mechanical Life (x10 ⁶ Operations)	No's	20	20	10	15	15	10	10	15
14	Electrical Life (x10 ⁶ Operations)	No's	2.1	1.4	1.2	1.2	2	2.2	1	2
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1800	1000	1000	1200	6000	1200
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°	±30°	±30°
17	Coil Consumption (AC 50 Hz)									
	Inrush	VA	60	60	95	68	68	70	65	48
	Sealed	VA	7.5	7.5	8.5	10	10	8	9	6
18	Accessories									
	Add On Block	Front Mounted	●	●	●	●	●	●	●	●
		Side Mounted	●	●	x	●	●	●	●	●
	Pneumatic Timers	ON/OFF Delay	●	●	x	●	●	●	●	●
		Star Delta	●	●	x	●	●	●	●	●
	Coil Suppressor		●	●	●	●	●	●	●	●
	Mechanical Interlock		●	●	●	●	●	●	●	●

Contactor Technical Competitive Comparison

Product : AC Contactor 18A - Applicable Standard IS/IEC 60947-4-1

No.	Parameters	Unit		Schneider Electric		Siemens		ABB		GE
			T Range	TeSyS	TesyS E	3TF	3TR	A LINE	B LINE	CL
1	Product Reference	Unit	TC1D18	LC1-D18	LC1E18	3TF32	3TR32	A16	B16	CL02
2	Frame Size (width in mm)	MM	45	45	45	45	45	44	45	45
3	Permissible/Operational Ambient Temperature	Degree C	-5 to + 55	-5 to + 55	-5 to + 55	-25 to +55	-25 to +60	-25 to +55		n/a
4	Number of Poles (Power)	No's	3	3	3	3	3	3		3
5	Rated Insulation Voltage (Ui)	V	1000	1000	690	690	690	1000	690	1000
6	Rated Operational Voltage (Ue)	V	690	690	690	690	690	690	690	690
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	32	32	32	30	30	30	25	25
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	18	18	18	16	18	17	16	12
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	9	9	7.5	8	11	7.5		7.5
11	Rated Making Current	A	300	300	180	n/a	n/a	170	300	450
12	Rated Breaking Current	A	300	300	144	n/a	n/a	136	200	250
13	Mechanical Life (x10 ⁶ Operations)	No's	20	16	10	15	15	10	10	15
14	Electrical Life (x10 ⁶ Operations)	No's	1.6	2	1.2	1.2	2	2.3	1.5	1.7
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1800	750	750	1200	6000	1200
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°	±30°	±30°
17	Coil Consumption (AC 50 Hz)									
	Inrush	VA	60	60	95	68	68	70	65	48
	Sealed	VA	7	8	8.5	10	10	8	7	6
18	Accessories									
	Add On Block	Front Mounted	●	●	●	●	●	●		●
		Side Mounted	●	●	x	●	●	●		●
	Pneumatic Timers	ON/OFF Delay	●	●	x	●		●		●
		Star Delta	●	●	x	●		X		●
	Coil Suppressor		●	●	●	●	●	●		●
	Mechanical Interlock		●	●	●	●	●	●		●

Product : AC Contactor 25A - Applicable Standard IS/IEC 60947-4-1

No.	Parameters	Unit		Schneider Electric		Siemens		ABB		GE
			T Range	TeSyS	TesyS E	3TF	3TR	A LINE	B LINE	CL
1	Product Reference	Unit	TC1D25	LC1-D25	LC1DE25	3TF33	3TR33	A26	B25	CL03
2	Frame Size (width in mm)	MM	56	45	45	45	45	54	45	45
3	Permissible/Operational Ambient Temperature	Degree C	-5 to + 55	-5 to + 55	-5 to + 55	-25 to +55	-25 to +60	-25 to +55		n/a
4	Number of Poles (Power)	No's	3	3	3	3	3	3		3
5	Rated Insulation Voltage (Ui)	V	1000	1000	690	690	690	1000	690	1000
6	Rated Operational Voltage (Ue)	V	690	690	690	690	690	690	690	690
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	40	40	36	30	30	45	40	45
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	25	25	25	22	25	26	25	25
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	11		11	11	12.5	11		13
11	Rated Making Current	A	450	450	250	n/a	n/a	260	390	550
12	Rated Breaking Current	A	450	450	200	n/a	n/a	208	315	450
13	Mechanical Life (x10 ⁶ Operations)	No's	16	16	8	15	15	10	10	15
14	Electrical Life (x10 ⁶ Operations)	No's	1.6	2	1	1.2	2	1.6	1.5	1.4
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1800	750	750	1200	3000	1200
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°	±30°	±30°
17	Coil Consumption (AC 50 Hz)									
	Inrush	VA	90	100	70	68	68	120	85	88
	Sealed	VA	7.5	8.5	7	10	10	12	7	9
18	Accessories									
	Add On Block	Front Mounted	●	●	●	●	●	●		●
		Side Mounted	●	●	x	●	●	●		●
	Pneumatic Timers	ON/OFF Delay	●	●	x	●		●		●
		Star Delta	●	●	x	●		X		●
	Coil Suppressor		●	●	●	●	●	●		●
	Mechanical Interlock		●	●	●	●	●	●		●

Contactor Technical Competitive Comparison

Product : AC Contactor 32A/38A - Applicable Standard IS/IEC 60947-4-1

No.	Parameters	Unit	TCELECTRIC CONTROLS			Schneider Electric		Siemens		ABB		GE
			T Range	TeSyS	Tesys E	3TF	3TR	A LINE	B LINE	CL		
1	Product Reference	Unit	TC1D32	LC1-D32	LC1E32	3TF34	3TR34	A30	B25	CL04		
2	Frame Size (width in mm)	MM	56	45	56	45	55	54			45	
3	Permissible/Operational Ambient Temperature	Degree C	-5 to +55	-5 to +55	-5 to +55	-25 to +55	-25 to +60	-25 to +55			n/a	
4	Number of Poles (Power)	No's	3		3	3	3	3			3	
5	Rated Insulation Voltage (Ui)	V	1000	1000	690	690	690	1000	690		1000	
6	Rated Operational Voltage (Ue)	V	690	690	690	690	690	690	690		690	
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	50	50	50	65	55	65	40		60	
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	32	32	32	32	32	32	25		32	
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	15		15/18.5	17	17	15			16	
11	Rated Making Current	A	550	550	320/380	n/a	n/a	320	390		550	
12	Rated Breaking Current	A	550	550	256/304	n/a	n/a	256	315		450	
13	Mechanical Life (x10 ⁶ Operations)	No's	16	16	8	10	15	10	10		15	
14	Electrical Life (x10 ⁶ Operations)	No's	1.5	2	1	1.4	2	1.6	1.5		2	
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1800	750	750	1200	3000		1200	
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°	±30°		±30°	
17	Coil Consumption (AC 50 Hz)											
	Inrush	VA	90	100	70	101	101	120	85		88	
	Sealed	VA	7.5	8.5	7	12.1	12.1	12	7		9	
18	Accessories											
	Add On Block	Front Mounted	•	•	•	•	•	•			•	
		Side Mounted	•	•	x	•	•	•			•	
	Pneumatic Timers	ON/OFF Delay	•	•	x	•		•			•	
		Star Delta	•	•	x	•					•	
	Coil Suppressor		•	•	•	•	•	•			•	
	Mechanical Interlock		•	•	•	•	•	•			•	

Product : AC Contactor 40A - Applicable Standard IS/IEC 60947-4-1

No.	Parameters	Unit	TCELECTRIC CONTROLS			Schneider Electric		Siemens		ABB		GE
			T Range	TeSyS	Tesys E	3TF	3TR	A LINE	B LINE	CL		
1	Product Reference	Unit	TC1D40	LC1-D40	LC1E40	3TF35	3TR35	A40	B40	CL45		
2	Frame Size (width in mm)	MM	75	75	75	55	55	54			55	
3	Permissible/Operational Ambient Temperature	Degree C	-5 to +55	-5 to +55	-5 to +55	-25 to +55	-25 to +60	-25 to +55			n/a	
4	Number of Poles (Power)	No's	3		3	3	3	3			3	
5	Rated Insulation Voltage (Ui)	V	1000	1000	690	690	690	1000	1000		1000	
6	Rated Operational Voltage (Ue)	V	690	690	690	690	690	690	1000		690	
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	60	60	60	55	55	65	70		60	
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	40	40	40	38	40	37	40		40	
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	22		22	20	21	18.5			20	
11	Rated Making Current	A	800	800	400	n/a	n/a	370	800		550	
12	Rated Breaking Current	A	800	800	320	n/a	n/a	296	700		450	
13	Mechanical Life (x10 ⁶ Operations)	No's	16	16	5	10	15	10	10		15	
14	Electrical Life (x10 ⁶ Operations)	No's	1.5	2	0.9	1.5	2	1.5	1.6		2	
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1200	600	600	1200	6000		1200	
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°	±30°		±30°	
17	Coil Consumption (AC 50 Hz)											
	Inrush	VA	200	245	200	101	101	120	175		88	
	Sealed	VA	20	26	20	12.1	12.1	12	17		9	
18	Accessories											
	Add On Block	Front Mounted	•	•	•	•	•	•			•	
		Side Mounted	•	•	x	•	•	•			•	
	Pneumatic Timers	ON/OFF Delay	•	•	x	•		•			•	
		Star Delta	•	•	x	•		X			•	
	Coil Suppressor		•	•	•	•	•	•			•	
	Mechanical Interlock		•	•	•	•	•	•			•	

Contactor Technical Competitive Comparison

Product : AC Contactor 50A - Applicable Standard IS/IEC 60947-4-1

No.	Parameters	Unit	TCELECTRIC CONTROLS			Schneider Electric		Siemens		ABB		GE
			T Range	TeSyS	Tesys E	3TF	3TR	A LINE	B LINE	CL		
1	Product Reference	Unit	TC1D50	LC1-D50	LC1E 65	3TF46	3TR46	A50			CL06	
2	Frame Size (width in mm)	MM	75	75	75	70	70	70			66	
3	Permissible/Operational Ambient Temperature	Degree C	-50 to +55	-50 to +55	-50 to +55	-25 to +55	-25 to +60	-25 to +55			n/a	
4	Number of Poles (Power)	No's	3	3	3	3	3	3			3	
5	Rated Insulation Voltage (Ui)	V	1000	1000	690	1000	1000	1000			1000	
6	Rated Operational Voltage (Ue)	V	690	690	690	1000	1000	1000			690	
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	80	80	70	80	80	100			90	
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	50	50	50	45	45	50			50	
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	25		25/30	24.6	24.6	25			25	
11	Rated Making Current	A	900	900	500	n/a	n/a	500			920	
12	Rated Breaking Current	A	900	900	400	n/a	n/a	400			780	
13	Mechanical Life (x10 ⁶ Operations)	No's	16	16	5	10	10	10			15	
14	Electrical Life (x10 ⁶ Operations)	No's	1.5		0.9	1.5	2	1.6			1.8	
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1200	1200	1200	600			1200	
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°			±30°	
17	Coil Consumption (AC 50 Hz)											
	Inrush	VA	200	245	200	183	183	180			190	
	Sealed	VA	20	26	20	17	17	18			15.5	
18	Accessories											
	Add On Block	Front Mounted	●	●	●	●	●	●			●	
		Side Mounted	●	●	x	●	●	●			●	
	Pneumatic Timers	ON/OFF Delay	●	●	x	●		●			●	
		Star Delta	●	●	x	●		X			●	
	Coil Suppressor		●	●	●	●	●	●			●	
	Mechanical Interlock		●	●	●	●	●	●			●	

Product : AC Contactor 65A - Applicable Standard IS/IEC 60947-4-1

No.	Parameters	Unit	TCELECTRIC CONTROLS			Schneider Electric		Siemens		ABB		GE
			T Range	TeSyS	Tesys E	3TF	3TR	A LINE	B LINE	CL		
1	Product Reference	Unit	TC1D65	LC1-D65	LC1E 65	3TF47	3TR47	A63			CL07	
2	Frame Size (width in mm)	MM	75	75	75	70	70	70			66	
3	Permissible/Operational Ambient Temperature	Degree C	-5 to +55	-5 to +55	-5 to +55	-25 to +55	-25 to +60	-25 to +55			n/a	
4	Number of Poles (Power)	No's	3		3	3	3	3			3	
5	Rated Insulation Voltage (Ui)	V	1000	1000	690	1000	1000	1000			1000	
6	Rated Operational Voltage (Ue)	V	690	690	690	1000	1000	1000			690	
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	80	80	80	90	90	125			110	
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	65	65	65	63	65	65			65	
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	37		37	34.4	35	37			30	
11	Rated Making Current	A	1000	1000	650	n/a	n/a	650			920	
12	Rated Breaking Current	A	1000	1000	520	n/a	n/a	520			780	
13	Mechanical Life (x10 ⁶ Operations)	No's	16	16	5	10	10	10			15	
14	Electrical Life (x10 ⁶ Operations)	No's	1.1		0.9	1.3	1.6	1.1			1.8	
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1200	1000	1000	600			1200	
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°			±30°	
17	Coil Consumption (AC 50 Hz)											
	Inrush	VA	200	245	200	183	183	180			190	
	Sealed	VA	20	26	26	17	17	18			15.5	
18	Accessories											
	Add On Block	Front Mounted	●	●	●	●	●	●			●	
		Side Mounted	●	●	x	●	●	●			●	
	Pneumatic Timers	ON/OFF Delay	●	●	x	●		●			●	
		Star Delta	●	●	x	●					●	
	Coil Suppressor		●	●	●	●	●	●			●	
	Mechanical Interlock		●	●	●	●	●	●			●	

Contactor Technical Competitive Comparison

Product : AC Contactor 80A - Applicable Standard IS/IEC 60947-4-1

No.	Parameters	Unit	TCELECTRIC CONTROLS			Schneider Electric		Siemens		ABB		GE
			T Range	TeSyS	Tesys E	3TF	3TR	A LINE	B LINE	CL		
1	Product Reference	Unit	TC1D80	LC1-D80	LC1E 80	3TF49	3TR49	A75	EH80	CL08		
2	Frame Size (width in mm)	MM	85		85	80	100	70			66	
3	Permissible/Operational Ambient Temperature	Degree C	-5 to +55	-5 to +55	-5 to +55	-25 to +55	-25 to +60	-25 to +55			n/a	
4	Number of Poles (Power)	No's	3		3	3	3	3			3	
5	Rated Insulation Voltage (Ui)	V	1000	1000	690	1000	1000	1000	1000		1000	
6	Rated Operational Voltage (Ue)	V	690	690	690	1000	1000	1000	1000		690	
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	125	125	110	100	100	125	145		110	
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	80	80	80	85	85	75	80		80	
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	45		45	66	49	40			40	
11	Rated Making Current	A	1100	1100	800	n/a	n/a	750	1200		920	
12	Rated Breaking Current	A	1100	1100	640	n/a	n/a	600	1100		780	
13	Mechanical Life (x10 ⁶ Operations)	No's	10	10	5	10	10	10	10		15	
14	Electrical Life (x10 ⁶ Operations)	No's	1.2	1.5	0.9	1.2	1.6	1.2	1.5		1.5	
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1200	850	850	600	3600		9000	
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°	±30°		±30°	
17	Coil Consumption (AC 50 Hz)											
	Inrush	VA	200	245	200	330	330	180	280		190	
	Sealed	VA	20	26	20	32	32	18	25		15.5	
18	Accessories											
	Add On Block	Front Mounted	•	•	•	•	•	•	•		•	
		Side Mounted	•	•	x	•	•	•	•		•	
	Pneumatic Timers	ON/OFF Delay	•	•	x	•		•			•	
		Star Delta	•	•	x	•					•	
	Coil Suppressor		•	•	•	•	•	•			•	
	Mechanical Interlock		•	•	•	•	•	•			•	

Product : AC Contactor 95A - Applicable Standard IS/IEC 60947-4-1

No.	Parameters	Unit	TCELECTRIC CONTROLS			Schneider Electric		Siemens		ABB		GE
			T Range	TeSyS	Tesys E	3TF	3TR	A LINE	B LINE	CL		
1	Product Reference	Unit	TC1D95	LC1-D95	LC1E95	3TF49	3TR49	A95			CL09	
2	Frame Size (width in mm)	MM	85	85	85	80	80	90			75	
3	Permissible/Operational Ambient Temperature	Degree C	-5 to +55	-5 to +55	-5 to +55	-25 to +55	-25 to +60	-25 to +55			n/a	
4	Number of Poles (Power)	No's	3	3	3	3	3	3			3	
5	Rated Insulation Voltage (Ui)	V	1000	1000	690	1000	1000	1000	1000		1000	
6	Rated Operational Voltage (Ue)	V	690	690	690	1000	1000	1000	1000		690	
7	Rated Thermal Current (Ith) 415V AC1 Duty ≤ 40°C	A	125	125	120	100	100	145			140	
8	Rated Operating Current at 415V AC3 Duty ≤ 55°C	A	95	95	95	85	85	96			95	
10	Maximum Power Rating for Motor Control AC3 duty at 415V	KW	45		45	66	49	55			46	
11	Rated Making Current	A	1200	1200	950	n/a	n/a	960			1050	
12	Rated Breaking Current	A	1100	1100	760	n/a	n/a	768			950	
13	Mechanical Life (x10 ⁶ Operations)	No's	10	10	5	10	10	10			15	
14	Electrical Life (x10 ⁶ Operations)	No's	1.1		0.9	1.2	1.6	0.8			1.5	
15	Operating Frequency (AC3)	Ops / Hr.	3600	3600	1200	850	850	3600			5000	
16	Mounting Position		±30°	±30°	±30°	±22.5°	±30°	±30°			±30°	
17	Coil Consumption (AC 50 Hz)											
	Inrush	VA	200	245	200	330	330	350			190	
	Sealed	VA	20	26	20	32	32	22			15.5	
18	Accessories											
	Add On Block	Front Mounted	•	•	•	•	•	•	•		•	
		Side Mounted	•	•	x	•	•	•	•		•	
	Pneumatic Timers	ON/OFF Delay	•	•	x	•		•			•	
		Star Delta	•	•	x	•					•	
	Coil Suppressor		•	•	•	•	•	•			•	
	Mechanical Interlock		•	•	•	•	•	•			•	