

## UL ratings

### Type E and Type F combination motor controllers

The UL standard indicates a combination motor controller, also called a combination starter, as equipment consisting of a protected starter incorporating an isolation function. The protection includes both thermal overload and short circuit.

In the standard of UL508 (now harmonized with IEC as UL 60947-4-1), we can find

different construction types of starters stated as Type A, Type B, etc... composed of different type of devices intended to control, disconnect and protect a motor. Type E and Type F controllers usually provide the best solution to control and protect a motor.

#### Type E

A Type E starter is a listed combination starter suitable for use without additional upstream circuit short-circuit protection. The typical Type E starter is a motor protection circuit breaker (MPCB), also known as manual motor protector that includes in a single device the following functions: manual motor control, disconnection, short circuit protection and motor overload protection. A "NON Type E" motor protection circuit breaker, despite including short circuit protection, requires additional upstream short circuit protection.

##### FUNCTIONS:

- Disconnect
- Branch circuit protection
- Motor control
- Motor overload protection.



● Phase separation barrier (required<sup>①</sup>)

● Motor protection circuit breaker also known as manual motor protector

#### Type F

A Type F starter has the same functions of Type E but in addition to the motor protection circuit breaker (MPCB) commonly known as manual motor protector, also includes a contactor to have remote or automatic control of the motor.

##### FUNCTIONS:

- Disconnect (MPCB)
- Branch circuit protection (MPCB)
- Motor control (contactor)
- Motor overload protection (MPCB).



● Phase separation barrier (required<sup>①</sup>)

● Motor protection circuit breaker also known as manual motor protector

● Rigid connection (optional)

● Contactor

<sup>①</sup> Code SM1X9000R or SM1X9050.

#### CO-ORDINATION TYPE 1 AND CO-ORDINATION TYPE 2

The concept of co-ordination Type 1 and Type 2 was recently introduced in the UL 60947-4-1.

In the co-ordination Type 1, after a short-circuit, the starter shall cause no danger to persons or installation, but may not be suitable for further service and may need parts repair and replacement.

In the co-ordination Type 2, after a short-circuit, the starter shall cause no danger to persons or installation and is suitable for further use.

On the next page the co-ordination tables are provided.

#### TAP CONDUCTOR PROTECTION

SM... motor protection circuit breakers are also suitable as Tap Conductor Protection for Group Installation.

When manual motor starters are employed in group installations, in specified conditions by the standard, it is possible to reduce the wire sections.

The use of smaller wires reduces the cost of the panel and makes the wiring easier. Furthermore, these motor protection circuit breakers can be used for control transformers protection instead of fuses or circuit breaker certified as UL 489.

### Maximum UL/CSA horsepower ratings

		Single-phase		Three-phase, 3-pole			
		110V-120V	220V-240V	200V-208V	220-240V	440/-480V	550V-600V
		[HP]	[HP]	[HP]	[HP]	[HP]	[HP]
SM1R0016	SM1P0016	—	—	—	—	—	—
SM1R0025	SM1P0025	—	—	—	—	—	—
SM1R0040	SM1P0040	—	—	—	—	—	—
SM1R0063	SM1P0063	—	—	—	—	—	—
SM1R0100	SM1P0100	—	—	—	—	1/2	1/2
SM1R0160	SM1P0160	—	1/10	—	—	3/4	1
SM1R0250	SM1P0250	—	1/6	1/2	1/2	1	1.5
SM1R0400	SM1P0400	1/8	1/3	3/4	3/4	2	3
SM1R0650	SM1P0650	1/4	1/2	1.5	1.5	3	5
SM1R1000	SM1P1000	1/2	1.5	2	3	5	7.5
SM1R1400 / SM1RE1400	SM1P1400	3/4	2	3	3	10	10 <sup>①</sup>
SM1R1800 / SM1RE1800	SM1P1800	1	3	5	5	10	15 <sup>①</sup>
SM1R2300 / SM1RE2300	SM1P2300	1.5	3	5	7.5	15	20 <sup>①</sup>
SM1R2500 / SM1RE2500	SM1P2500	2	3	5	7.5	15	20 <sup>①</sup>
SM1R3200 / SM1RE3200	SM1P3200	2	5	10	10	20	30 <sup>①</sup>
SM1R4000	SM1P4000	3	7.5	10	10	30	30 <sup>①</sup>
SM2R5000	—	3	10	15	15	30	40
SM2R6300	—	5	10	20	20	40	60
SM3R7500	—	5	15	20	25	50	60
SM3R9000	—	7 1/2	20	25	30	60	75
SM3R9900	—	10	20	30	30	75	100

<sup>①</sup> SM1R... and SM1RE... only