

## Star-delta starter with fused isolator

### With time delay contact block on contactor KM2

#### Power circuit operation

Manual closing of isolator Q1.  
 KM1 closes to create the star connection.  
 KM2 closes to feed the main motor current.  
 KM1 opens the star connection.  
 KM3 closes to create the delta loop.  
 KM2 and KM1 close together to start the motor in "star", after a short period KM1 opens and KM3 closes to finish the starting sequence with the motor finally connected in "delta".

#### • Features :

The motor windings, when connected in delta, must be rated for the main supply voltage.  
 Isolator Q1 is rated for the motor FLC (full load current)  
 Overload F2 is rated for the motor  $FLC / \sqrt{3}$   
 Contactor KM1 is rated for the motor  $FLC / 3$   
 Contactors KM2 and KM3 are rated for the motor  $FLC / \sqrt{3}$

#### Control circuit operation

Press push-button S2, KM1 closes.  
 A contact on KM1 will close KM2 (53-54).  
 A contact on KM2 will hold-in KM1 and KM2 (13-14).  
 After a short delay KM1 will open and KM3 will close (controlled by timed contact 67-68 on KM2 and contact 21-22 on KM1).  
 The drive may be stopped by pressing push-button S1.

#### • Features :

Electrical interlocking between KM1 and KM3.  
 The LA2-D time-delay contact block incorporates a 40 ms time delay between the opening of its N/C contact and the closing of its N/O contact. This eliminates any risk of a short-circuit during the star-delta transition, which could be caused by the arcing of the contactors.

#### Equipment required :

Q1 : 1 3-pole fused isolator (optional), rated for the motor FLC, type LS1-, GK1-, DK1- ; for use with 3 HRC motor type fuses, rated for the motor FLC.  
 KM1 : 1 3-pole + 1N/O + 1N/C contactor, rated for the motor  $FLC / 3$ , type LC1-  
 KM2 : 1 3-pole + 1N/O contactor, rated for the motor  $FLC / \sqrt{3}$ , type LC1-, and 1 "delay on energisation" add-on auxiliary contact block (time delay adjustable between 7 and 20 seconds, see "Features").  
 KM3 : 1 3-pole + 1N/C contactor, rated for the motor  $FLC / \sqrt{3}$ , type LC1-  
 Q2 : 1 control circuit breaker, type GB2  
 F1 : 1 thermal overload relay, in series with the motor windings, rated for motor  $FLC / \sqrt{3}$ , type LR2-

#### • Pilot devices :

S1-S2 : control units, type XB2-B, XA2-B, Domino 22 ; control stations, type XAL-

#### • Panel building components :

Enclosures, type AC3-, AC4-, ACM-, AA2-, AA3-, control panel busbar systems, type AK2-, AK3-, AK5-, mounting accessories, type DZ6-, AM1-, AM3-, AF1-, cable ducting and clips, type AK2-, terminal blocks and wiring accessories, type AB1-, AB3-, DB6-, DZ5-, AT1-, AR1-, ABR-, ABS-, ABA-, ABE-, ABL-

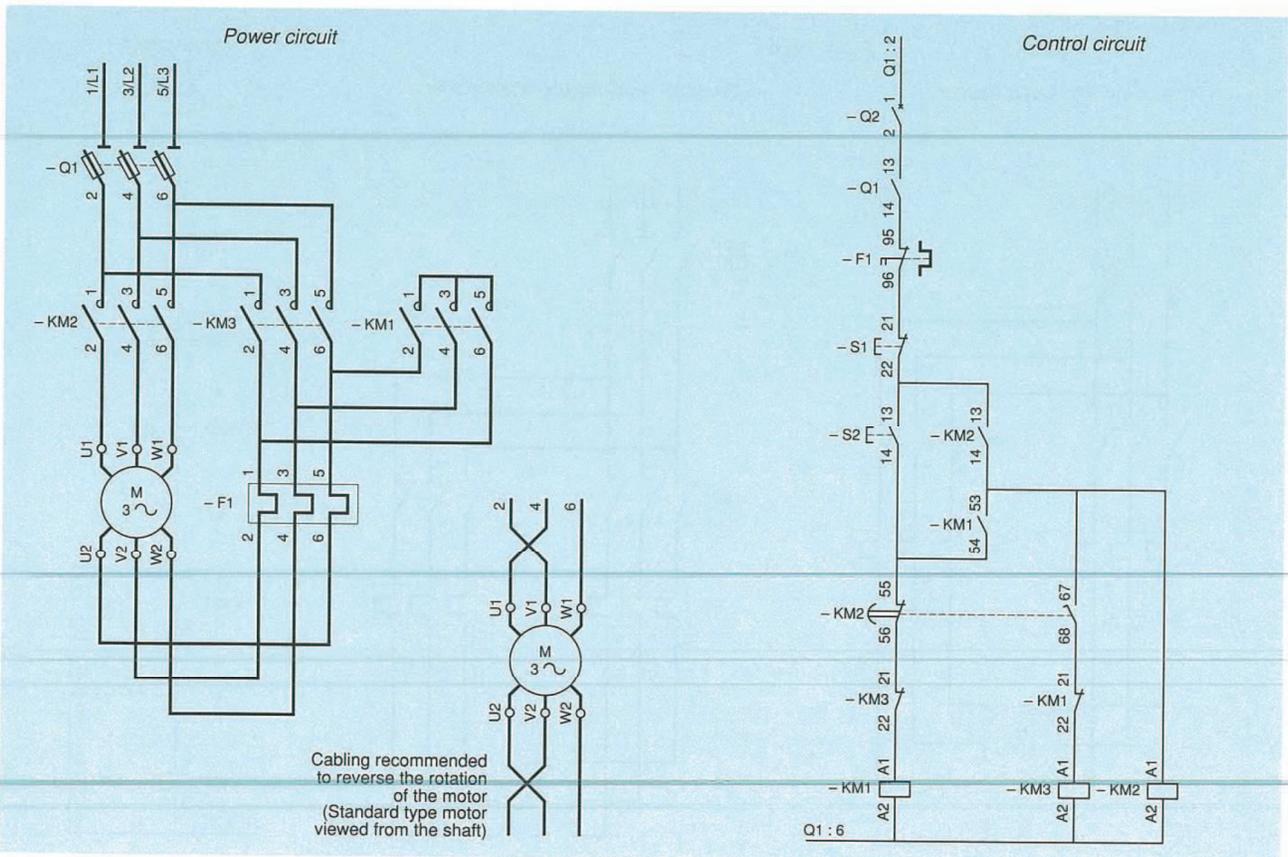
#### References of catalogued equipment :

• Open type : (with power and control circuits wired), without thermal overload relay, type LC3-D

#### • Enclosed type :

without thermal overload relay, without isolator, in dust and damp protecting enclosure, type LE3-  
 with isolator, in dust and damp protecting enclosure, type LE3-D

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## Star-delta starter with magnetic circuit breaker

### With time delay contact block on contactor KM2

#### Power circuit operation

Manual closing of circuit breaker Q1.  
KM1 closes to create the star connection.  
KM2 closes to feed the main motor current.  
KM1 opens the star connection.  
KM3 closes to create the delta loop.  
KM2 and KM1 close together to start the motor in "star", after a short period KM1 opens and KM3 closes to finish the starting sequence with the motor finally connected in "delta".

#### • Features :

The motor windings, when connected in delta, must be rated for the main supply voltage.  
Circuit breaker Q1 is rated for the motor FLC (full load current)  
Overload F2 is rated for the motor  $FLC / \sqrt{3}$   
Contactor KM1 is rated for the motor  $FLC / 3$   
Contactors KM2 and KM3 are rated for the motor  $FLC / \sqrt{3}$

#### Control circuit operation

Press push-button S2, KM1 closes.  
A contact on KM1 will close KM2 (53-54).  
A contact on KM2 will hold-in KM1 and KM2 (13-14).  
After a short delay KM1 will open and KM3 will close (controlled by timed contact 67-68 on KM2 and contact 21-22 on KM1).  
The drive may be stopped by pressing push-button S1.

#### • Features :

Electrical interlocking between KM1 and KM3.  
The LA2-D time-delay contact block incorporates a 40 ms time delay between the opening of its N/C contact and the closing of its N/O contact. This eliminates any risk of a short-circuit during the star-delta transition, which could be caused by the arcing of the contactors.

#### Equipment required :

Q1 : 1 3-pole magnetic circuit breaker, rated for the motor FLC, type GVL-2  
KM1 : 1 3-pole + 1N/O + 1N/C contactor, rated for the motor  $FLC / 3$ , type LC1-  
KM2 : 1 3-pole + 1N/O contactor, rated for the motor  $FLC / \sqrt{3}$ , type LC1-, and 1 "delay on energisation" add-on auxiliary contact block (time delay adjustable between 7 and 20 seconds, see "Features").  
KM3 : 1 3-pole + 1N/C contactor, rated for the motor  $FLC / \sqrt{3}$ , type LC1-  
Q2 : 1 control circuit breaker, type GB2  
F1 : 1 thermal overload relay, in series with the motor windings, rated for motor  $FLC / \sqrt{3}$ , type LR2-

#### • Pilot devices :

S1-S2 : control units, type XB2-B, XA2-B, Domino 22 ; control stations, type XAL-

#### • Panel building components :

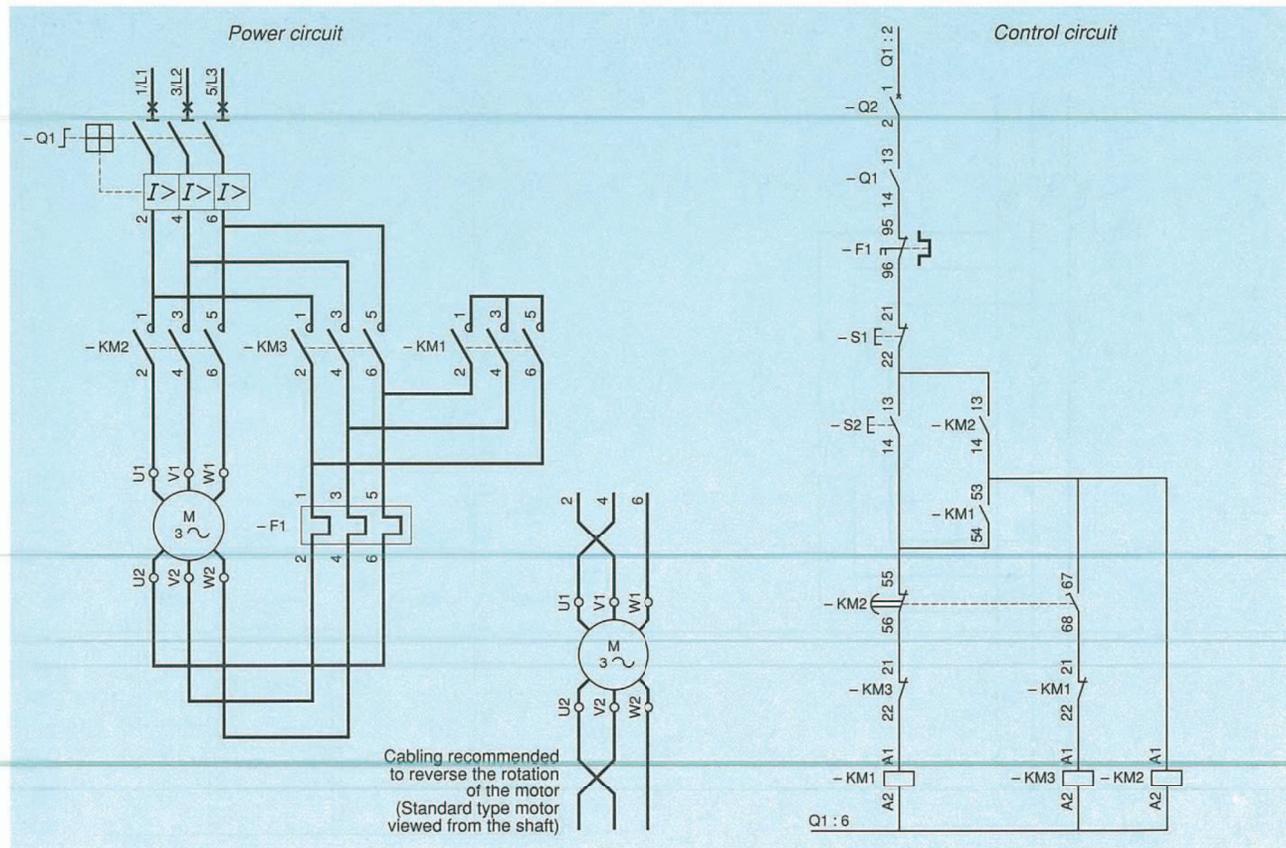
Enclosures, type AC3-, AC4-, ACM-, AA2-, AA3-, control panel busbar systems, type AK2-, AK3-, AK5-, mounting accessories, type DZ6-, AM1-, AM3-, AF1-, cable ducting and clips, type AK2-, terminal blocks and wiring accessories, type AB1-, AB3-, DB6-, DZ5-, AT1-, AR1-, ABR-, ABS-, ABA-, ABE-, ABL-

#### References of catalogued equipment :

• Open type : (with power and control circuits wired), without thermal overload relay, type LC3-D

#### • Enclosed type :

without thermal overload relay, without isolator, in dust and damp protecting enclosure, type LE3-  
with isolator, in dust and damp protecting enclosure, type LE3-D



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