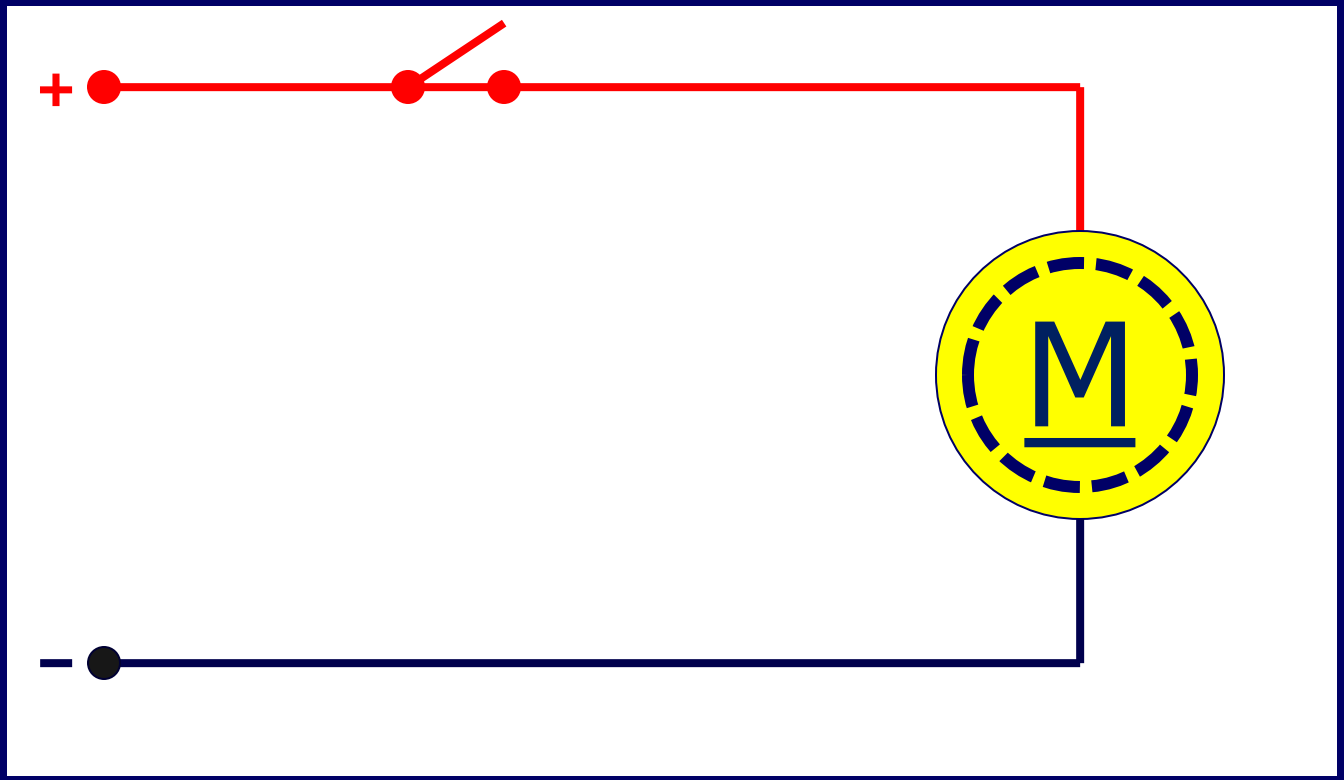
Motor Control
Direct Online

Motor Control

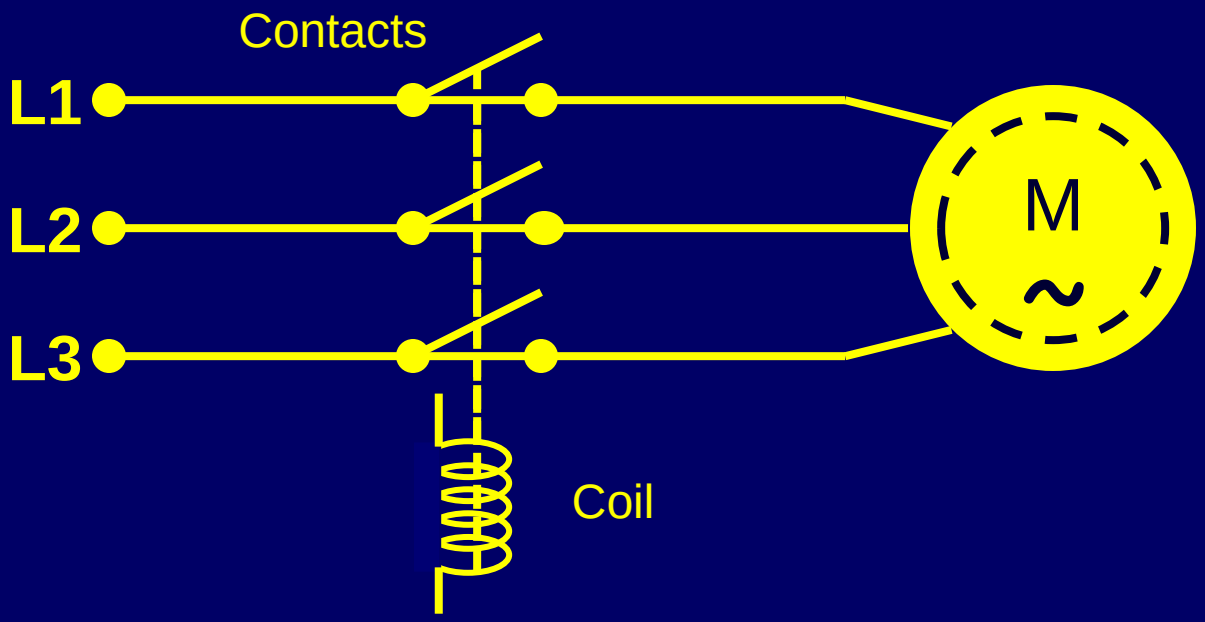
All electric motors require some form of starting method



In this DC case a simple switch would suffice

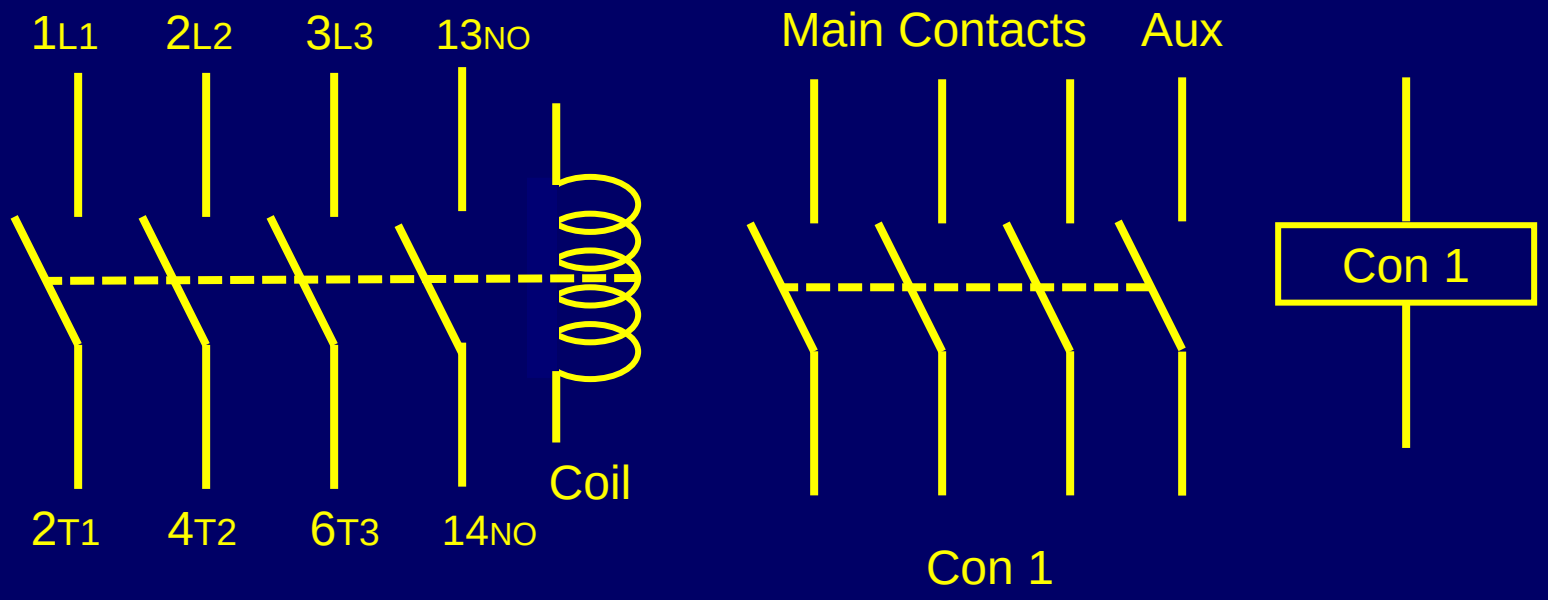
Three Phase AC Motor

With a three phase motor we need to switch all three live Lines on at the same time



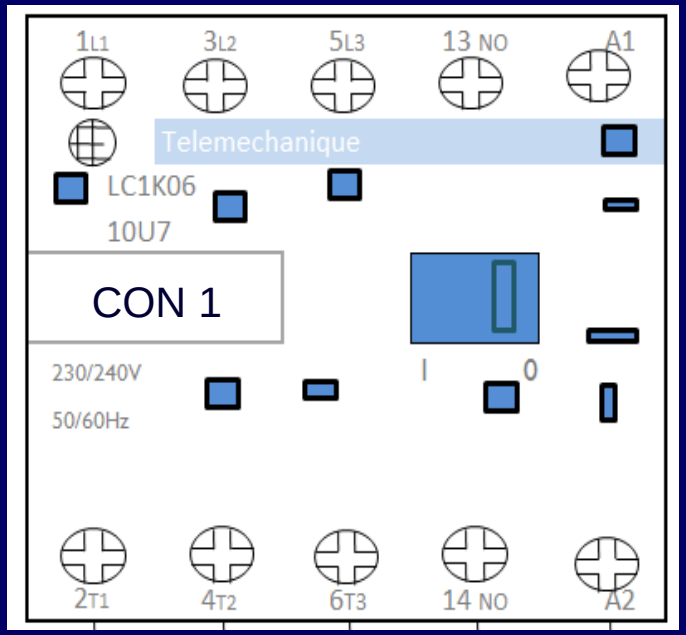
For this we can use a component called a CONTACTOR , this is an electrically controlled switch and consists of two main parts

Contactor Circuit Symbols



Contactor

The modern contactor has an internal operating coil and a set of spring loaded main contacts. Some versions have extra contacts integral to the design or as an add on component. These can be either normally open or normally closed, or a combination of both, called Auxiliary contacts.

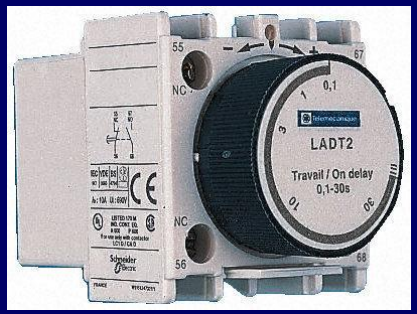


AC Motor Starting Methods

This type of starter configuration is called **Direct Online** and is the simplest most common method of starting motors

It consists of a contactor to supply the voltage directly through to the motor and some form of overload protection relay to protect the motor from excesses of current during overload situations

This configuration can be incorporated into one single device or by building modular starters using manufactured , type specific components

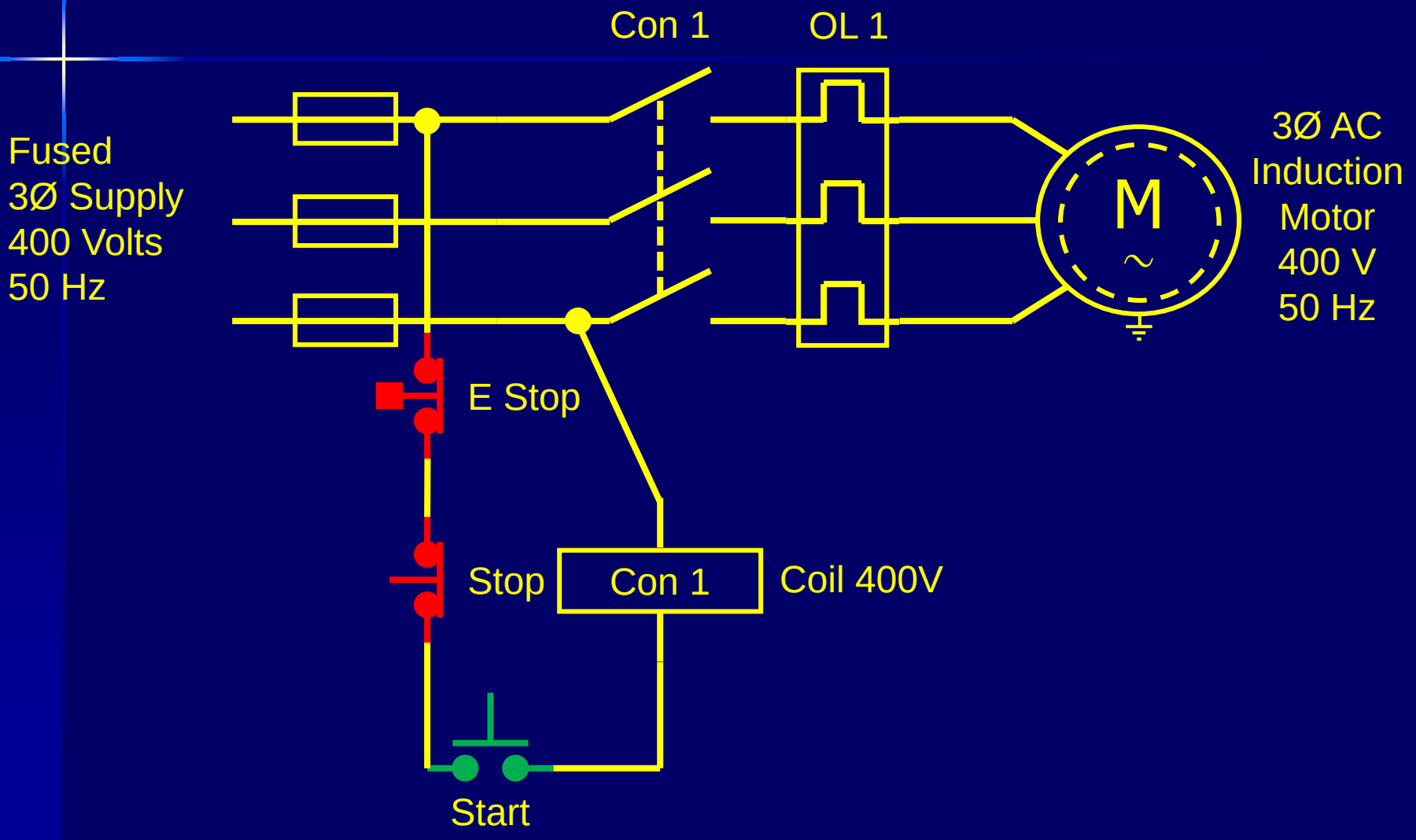


Overload

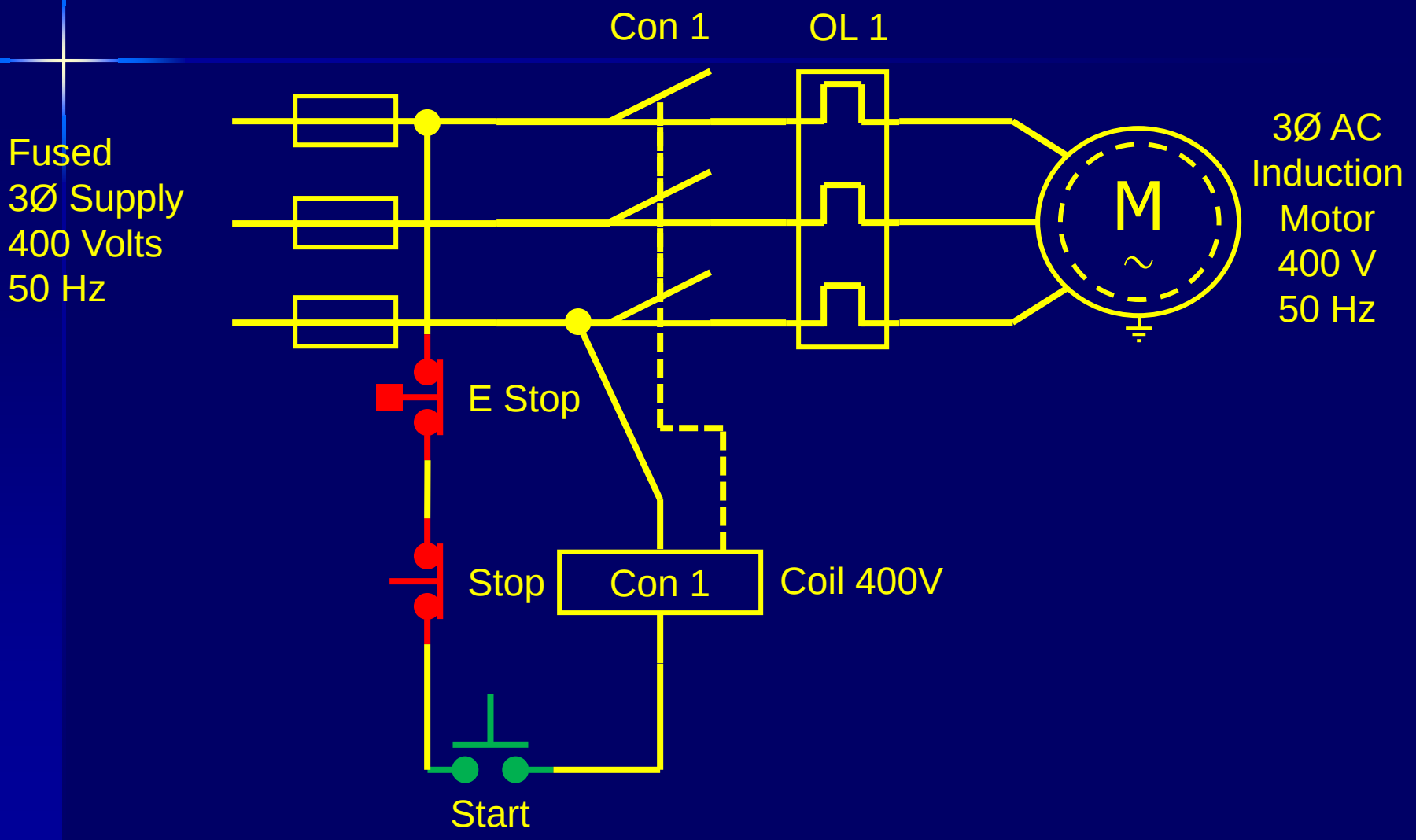
The overload is a thermal device and operates in much the same way as the thermal device in an MCB. It connects directly to the Contactor

Inside it contains 3 bi-metallic strips that monitor the current as it passes through each phase of the supply to the motor. Any current that exceeds the setting on the overload will cause that strip to bend which will mechanically trip a set of normally closed contacts in series with the Contactor coil supply

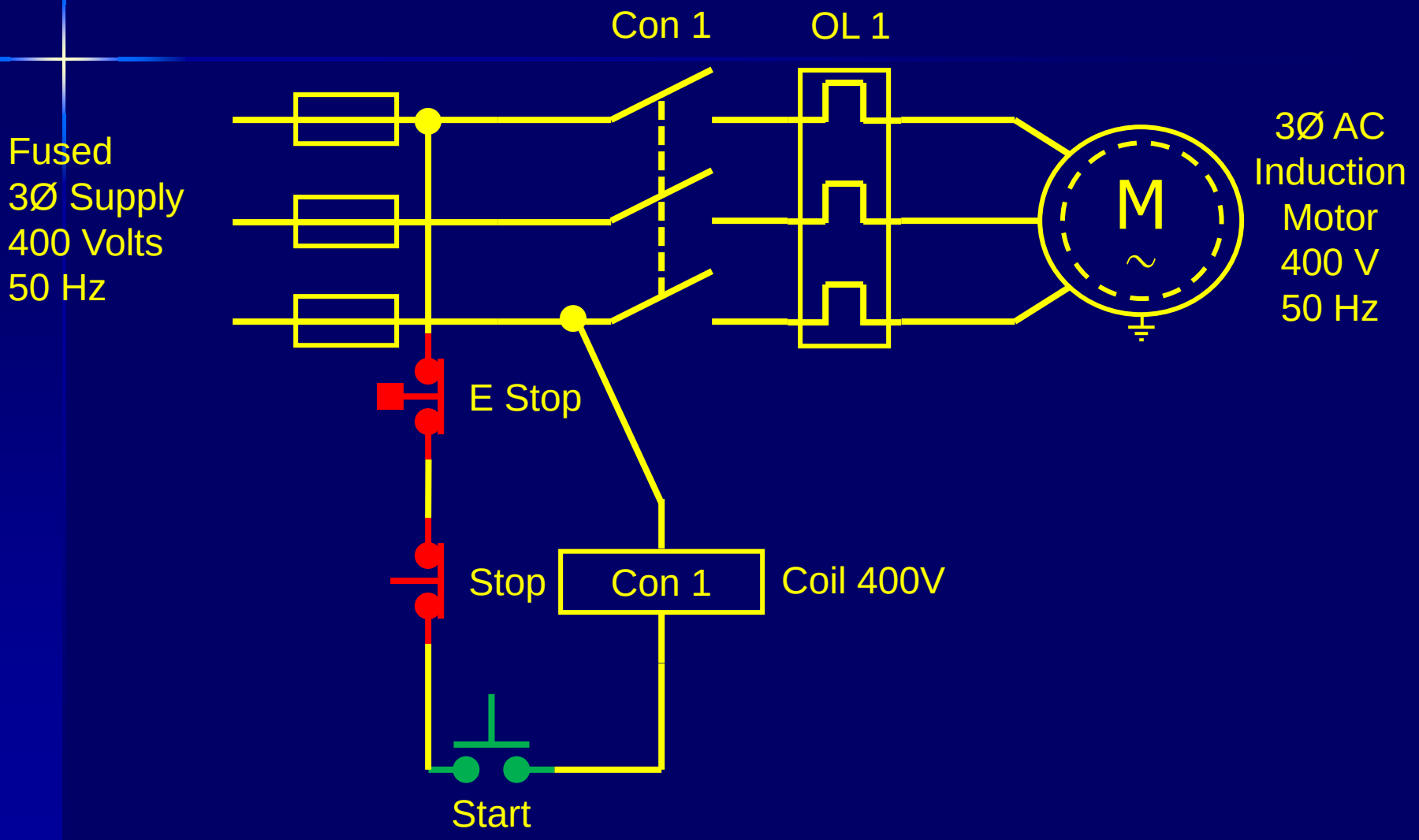
Configuration 400VAC Coil



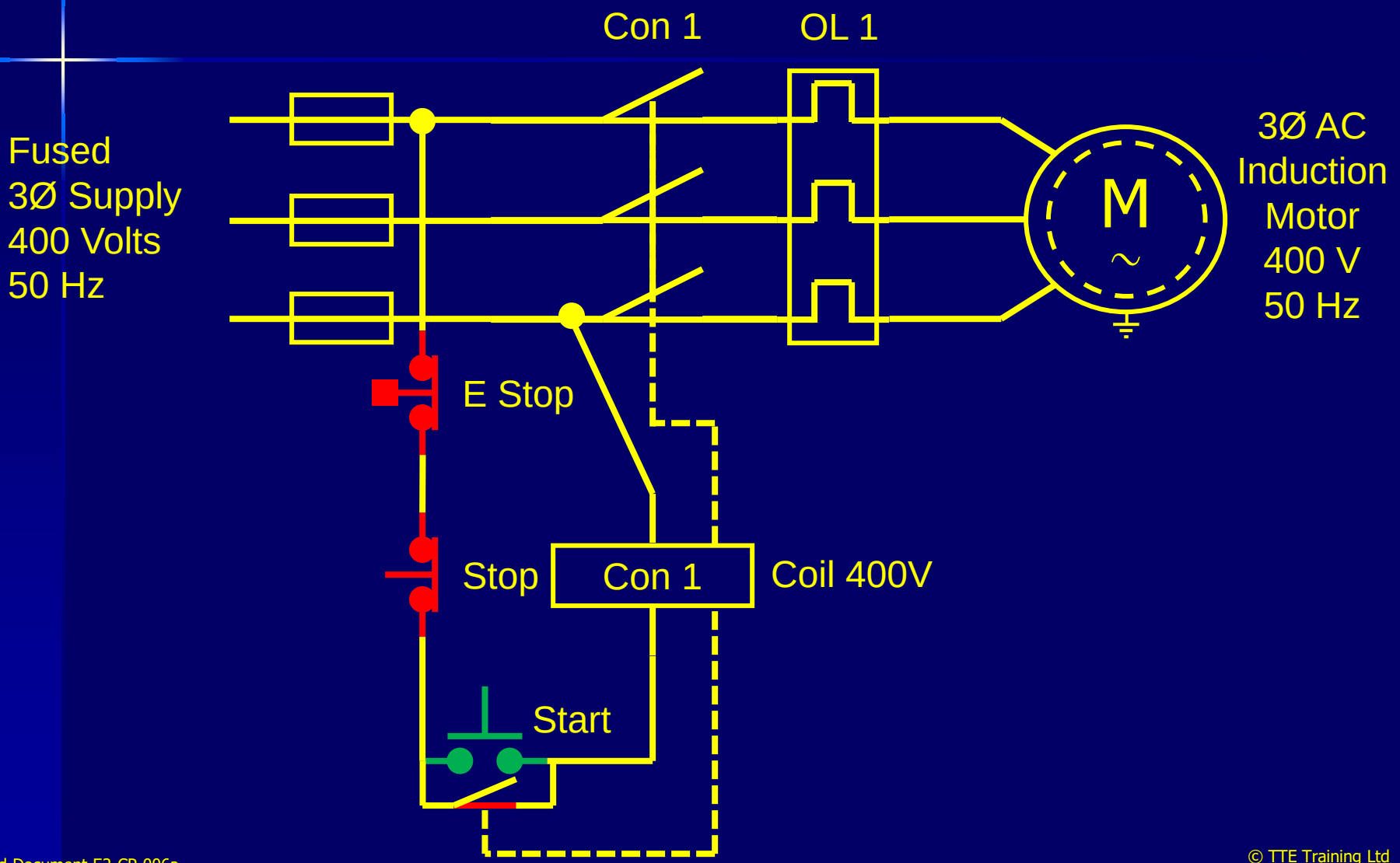
Configuration 400VAC Coil



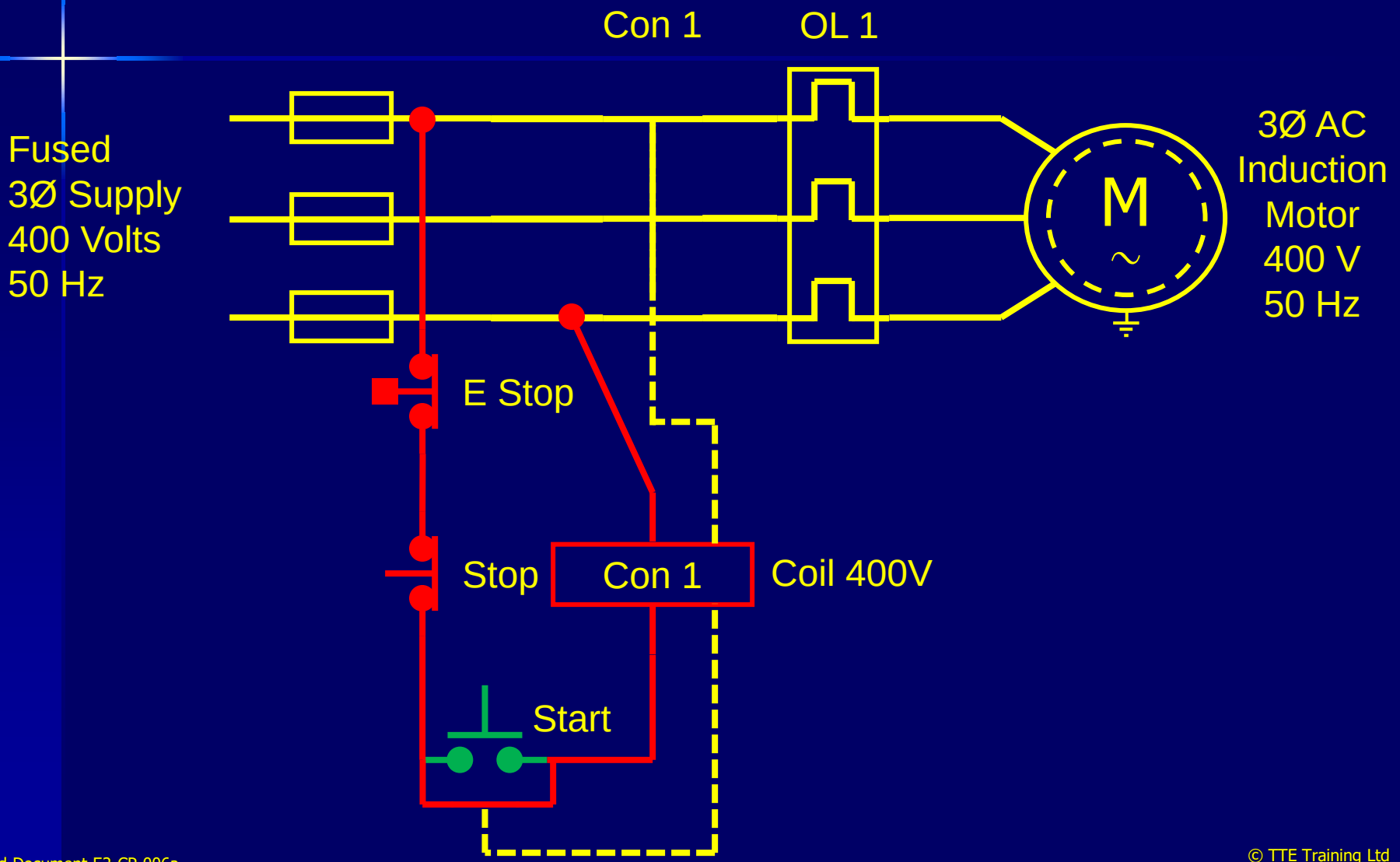
Configuration 400VAC Coil



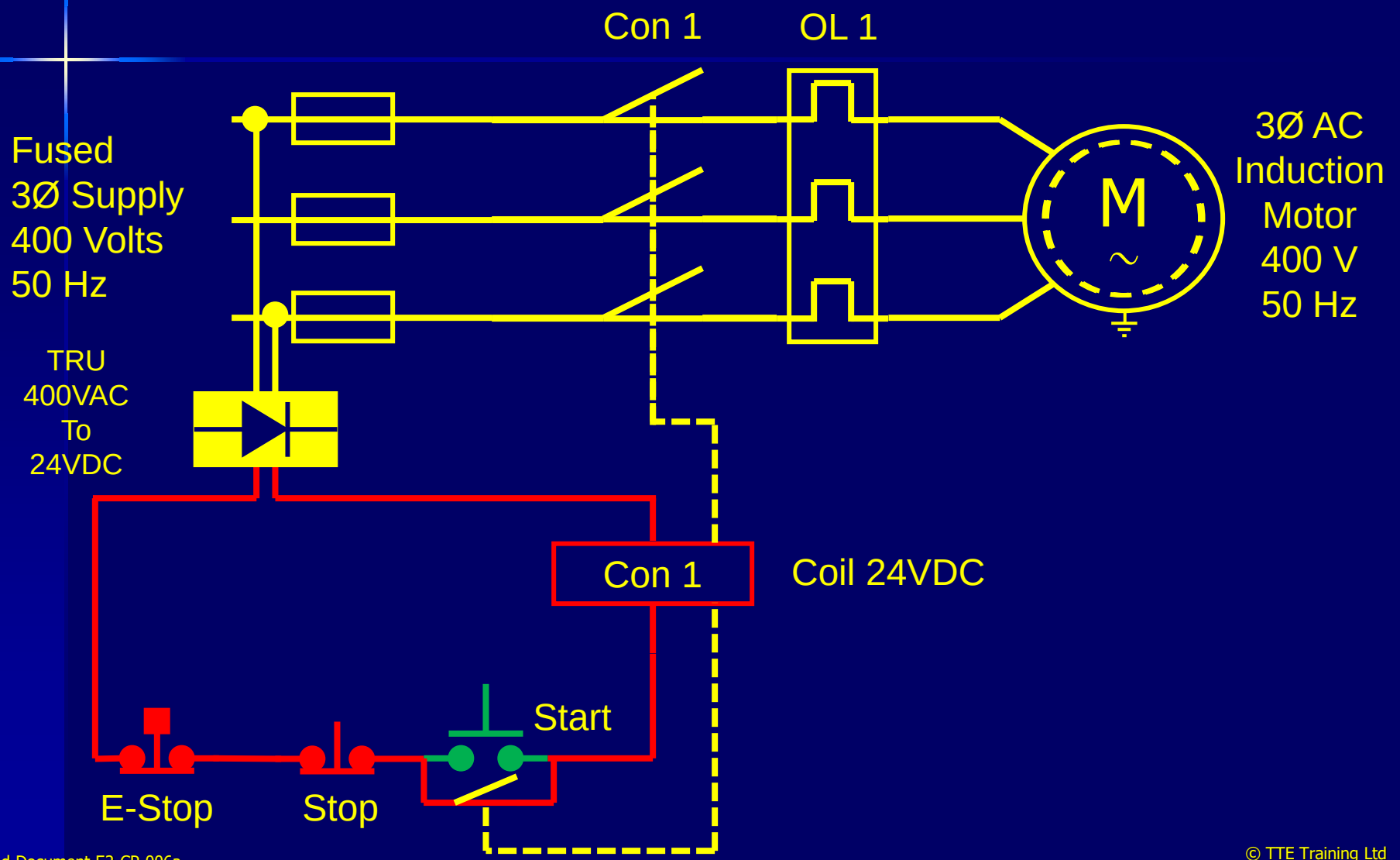
Configuration 400VAC Coil



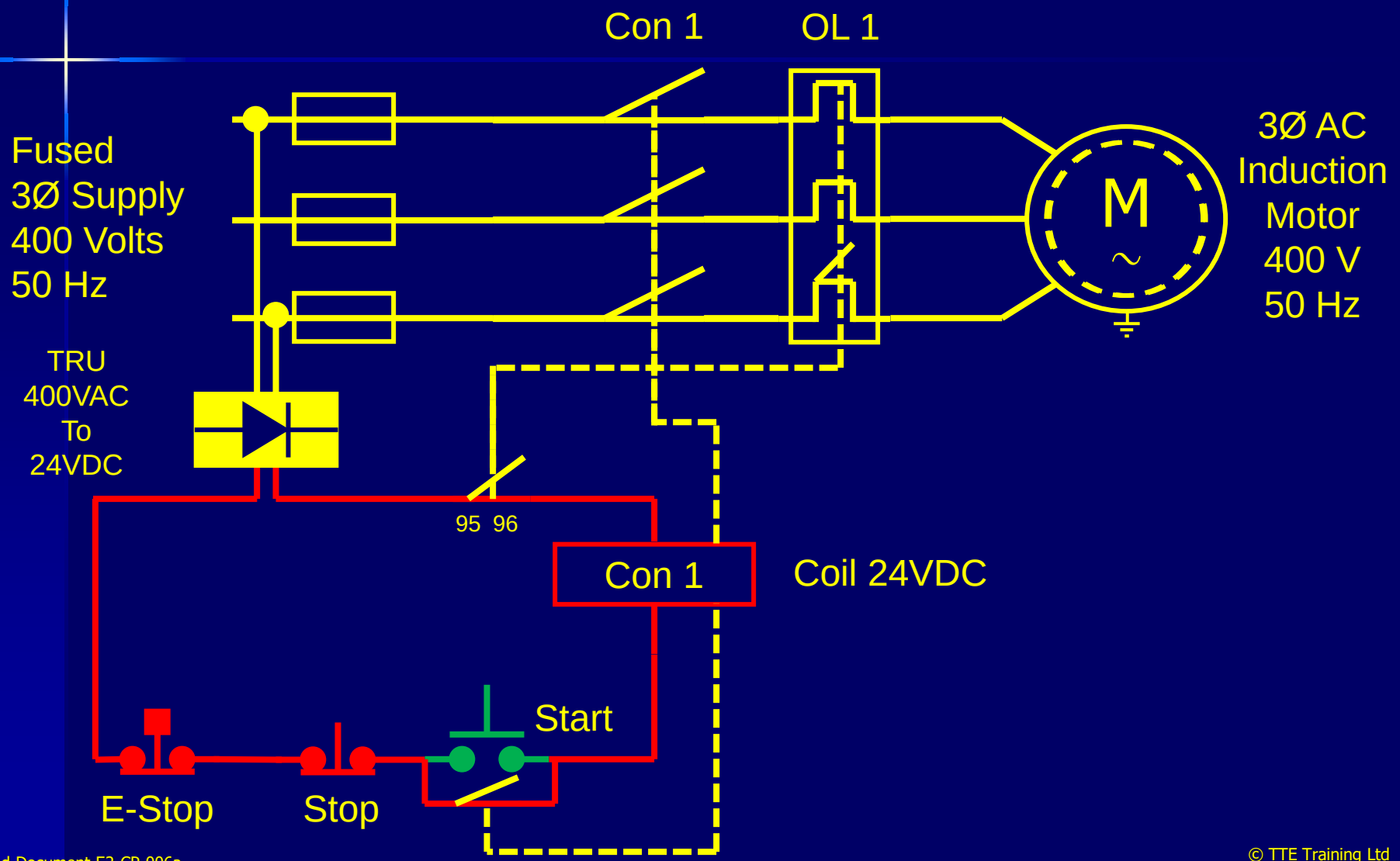
Configuration 400VAC Coil



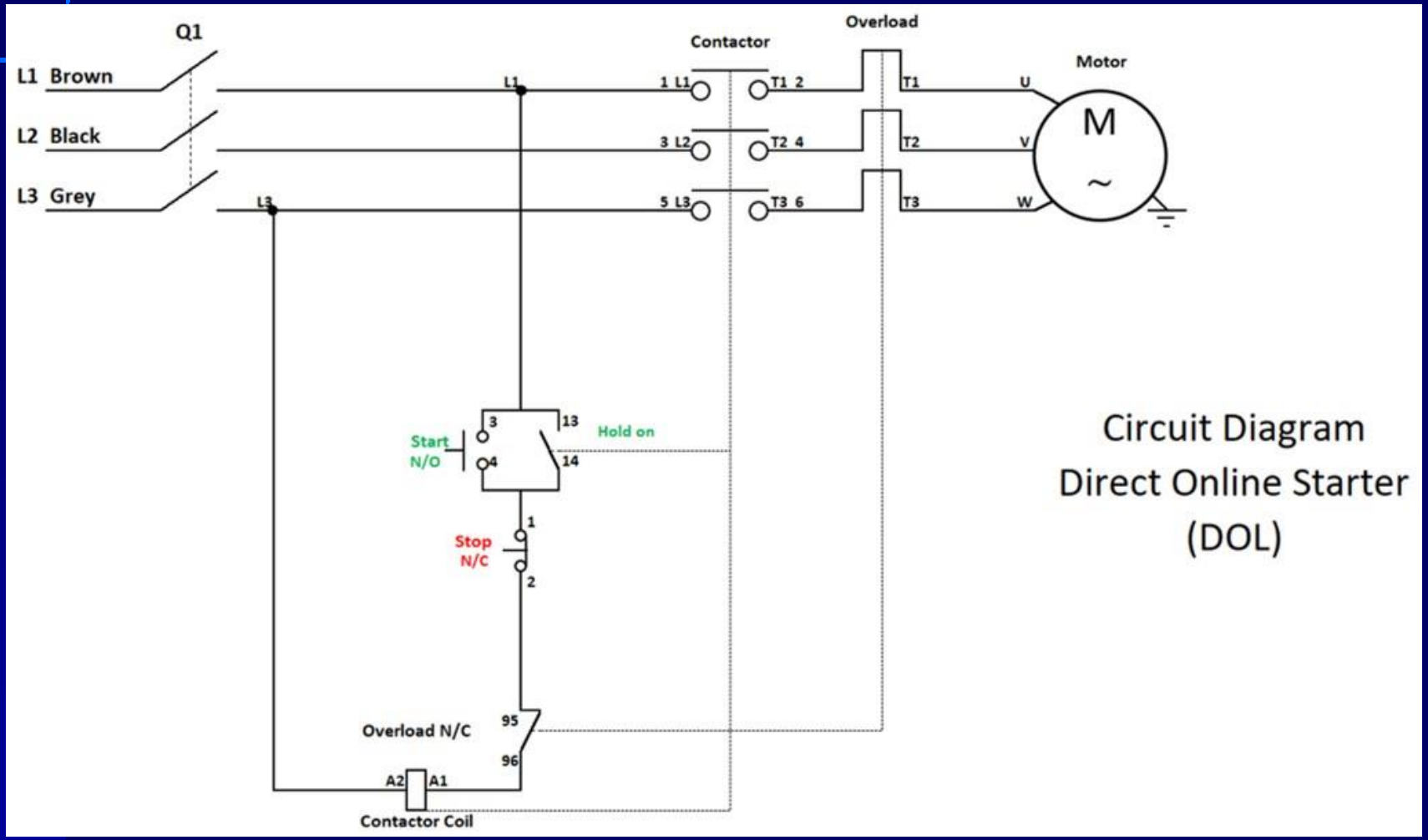
Configuration 24VDC Coil

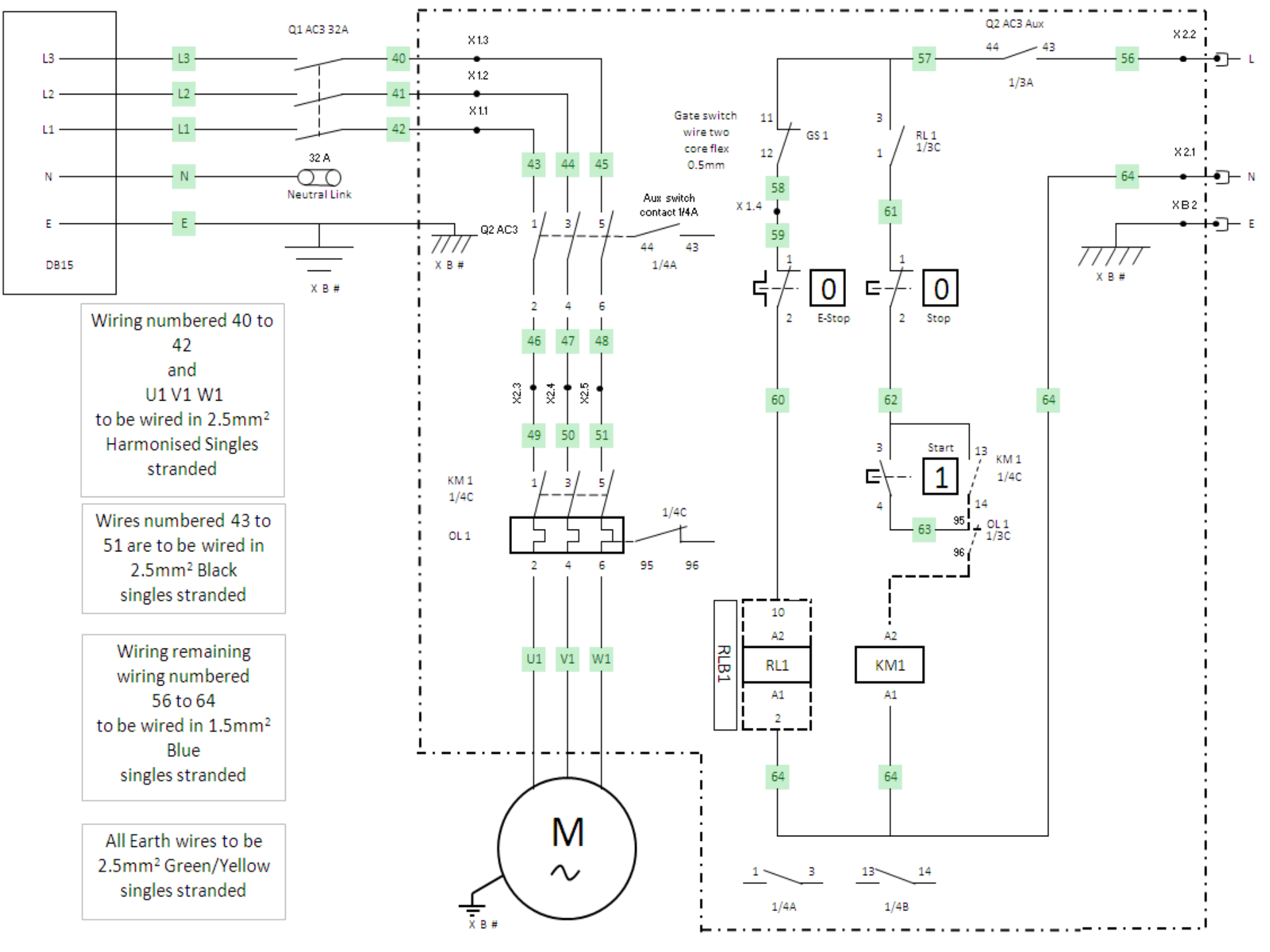


Overload



DOL 400V




L3
L2
L1
N
E
DB15
Q1 AC3 32A
32 A
Neutral Link
X B #
X1.3
X1.2
X1.1
Q2 AC3
Aux switch
contact 1/4A
Gate switch
wire two
core flex
0.5mm
GS 1
X 1.4
RL 1
1/3C
Q2 AC3 Aux
1/3A
X2.2
X2.1
XB2
E-Stop
Stop
Start
KM 1
1/4C
OL 1
1/3C
RLB1
RL1
KM1
A2
A1
M
1/4A
1/4B
Wiring numbered 40 to 42
and
U1 V1 W1
to be wired in 2.5mm²
Harmonised Singles
stranded
Wires numbered 43 to 51 are to be wired in 2.5mm² Black singles stranded
Wiring remaining wiring numbered 56 to 64
to be wired in 1.5mm²
Blue
singles stranded
All Earth wires to be 2.5mm² Green/Yellow singles stranded

AC Motor Starting Methods

Other methods of motor starting include:

STAR DELTA STARTERS:

This method requires the use of 3 contactors and a timer circuit

AUTO TRANSFORMER STARTERS

This method requires the use of contactors and a tapped autotransformer

RESISTANCE STARTERS

This method requires the use of contactors and specific resistances shorted out by the contactors during run up

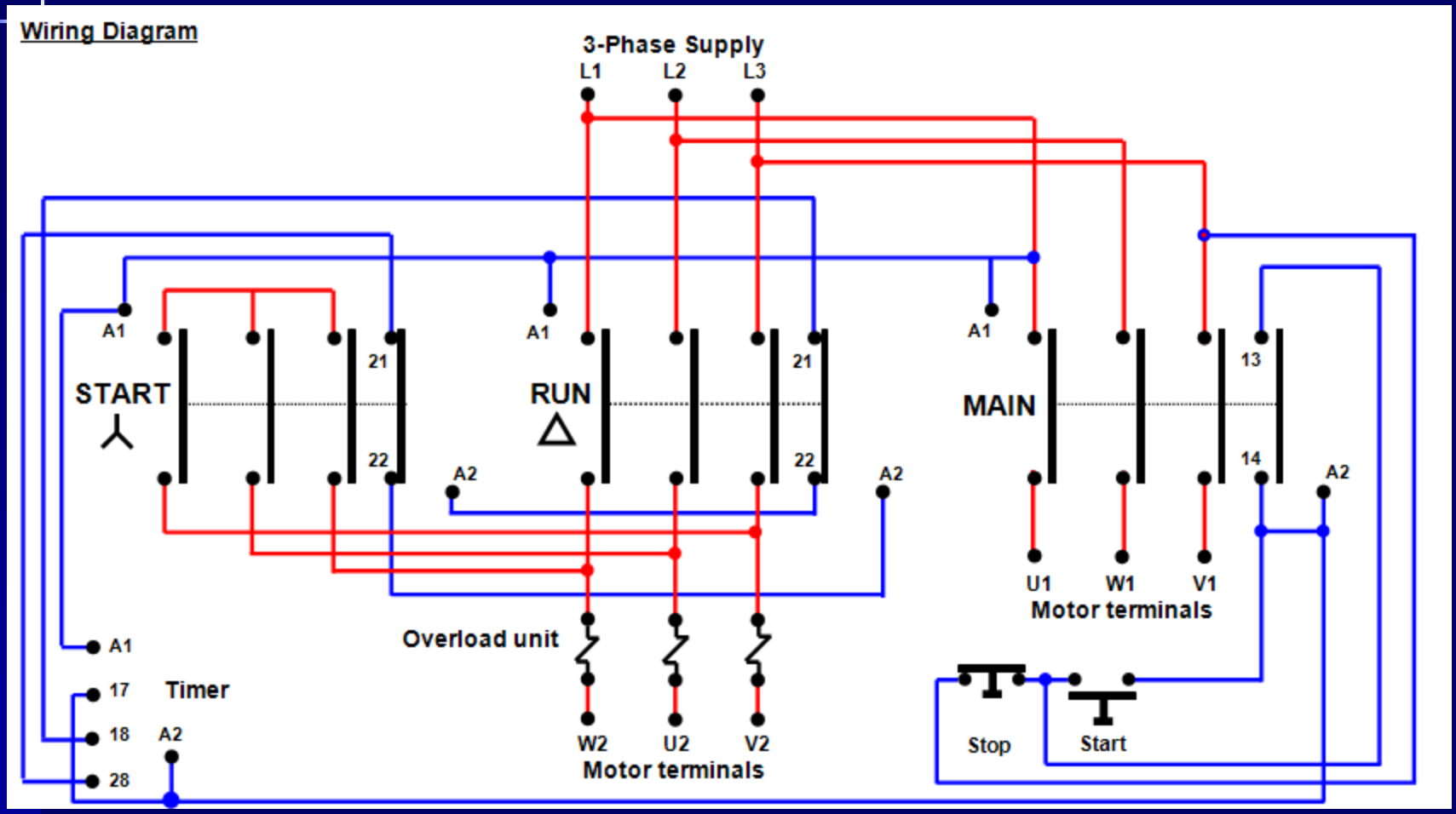
SOFT STARTERS

This method mainly uses semiconductor devices to control the supply to the motor electronically

VARIABLE SPEED DRIVES

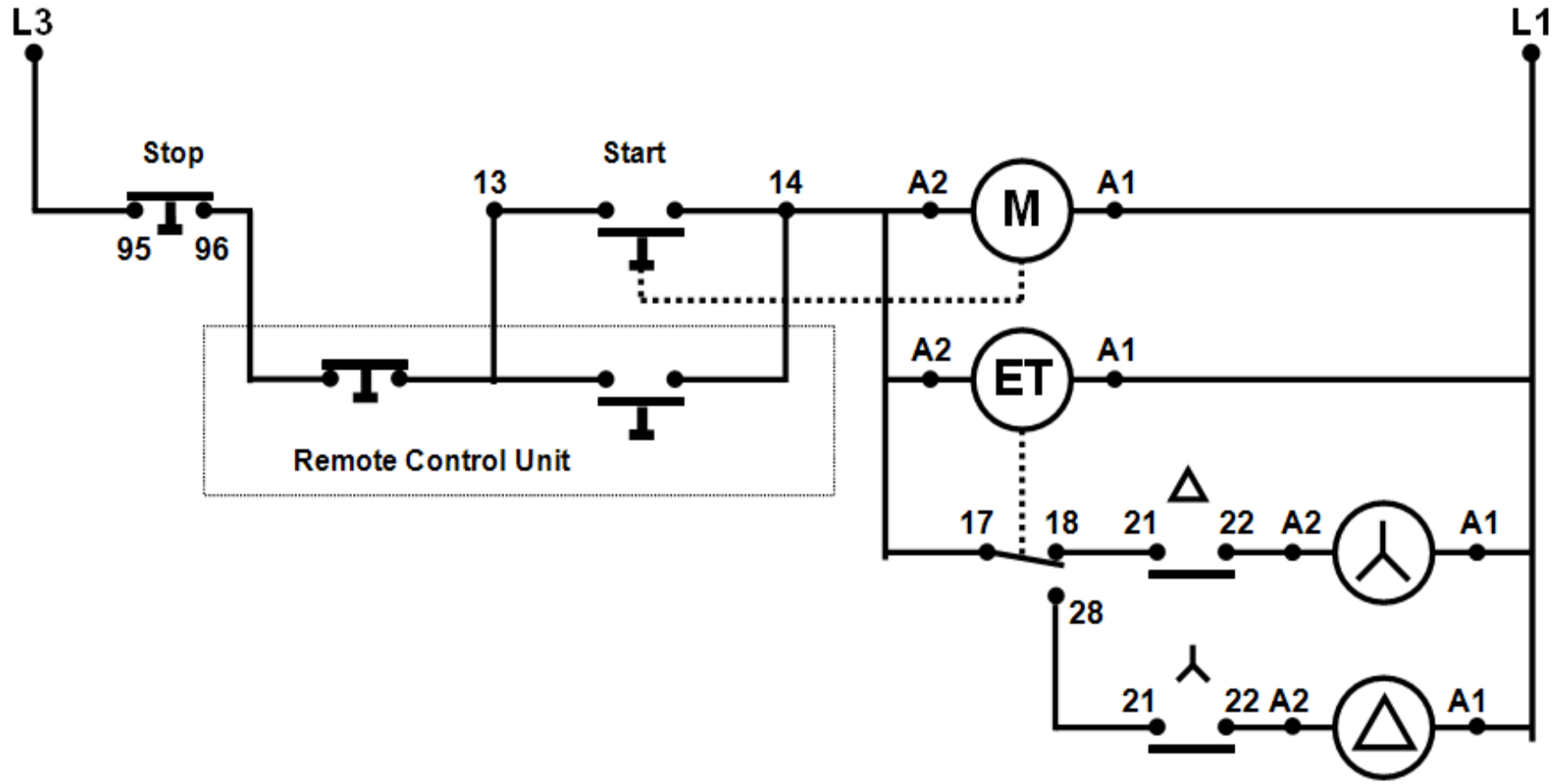
As a Soft Start but with a lot more functionality and control

STAR/DELTA Starting

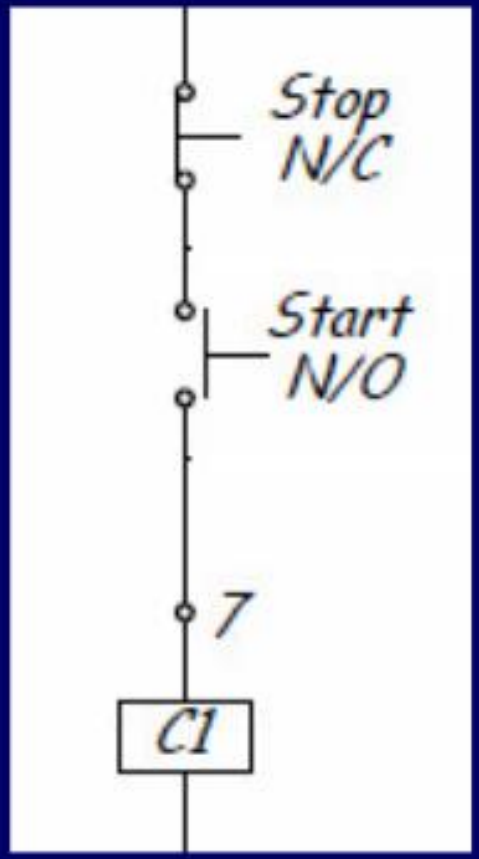


STAR/DELTA Starting

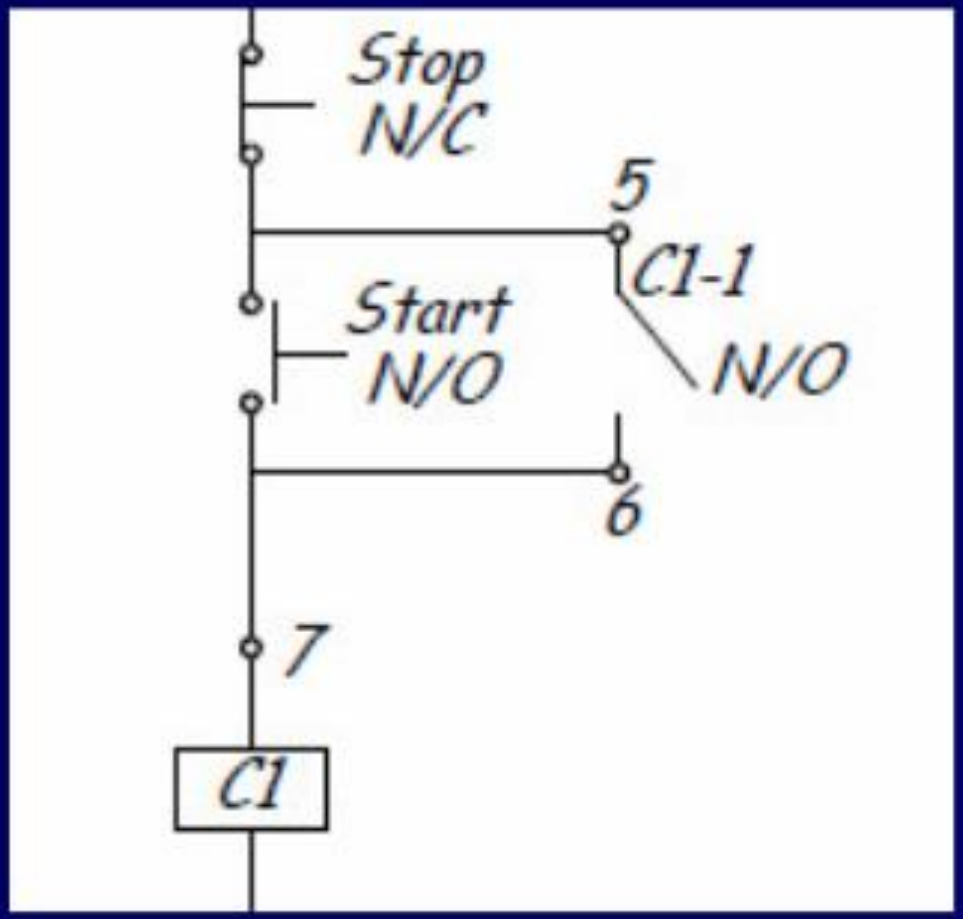
Schematic Diagram

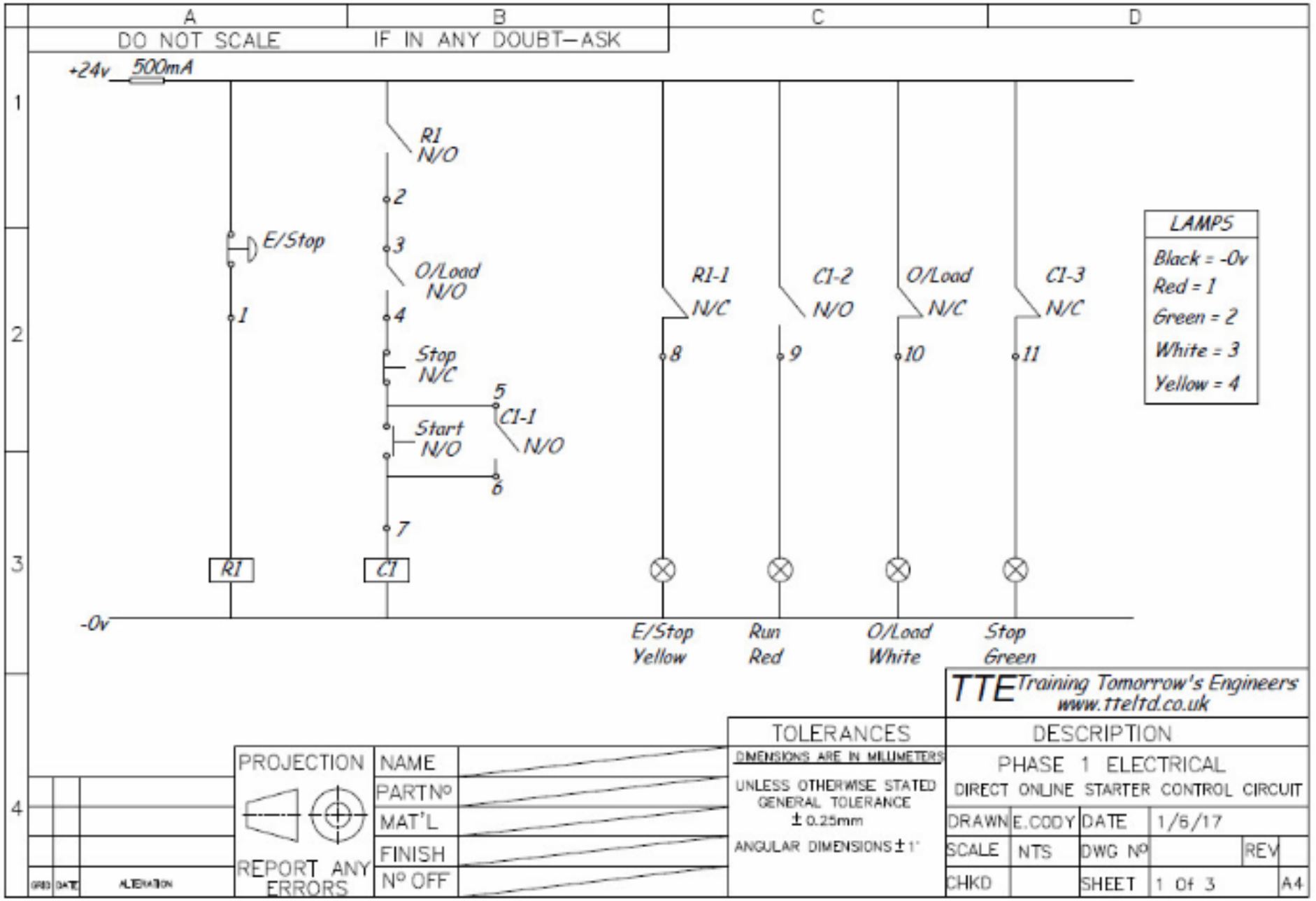


Basic Stop Start

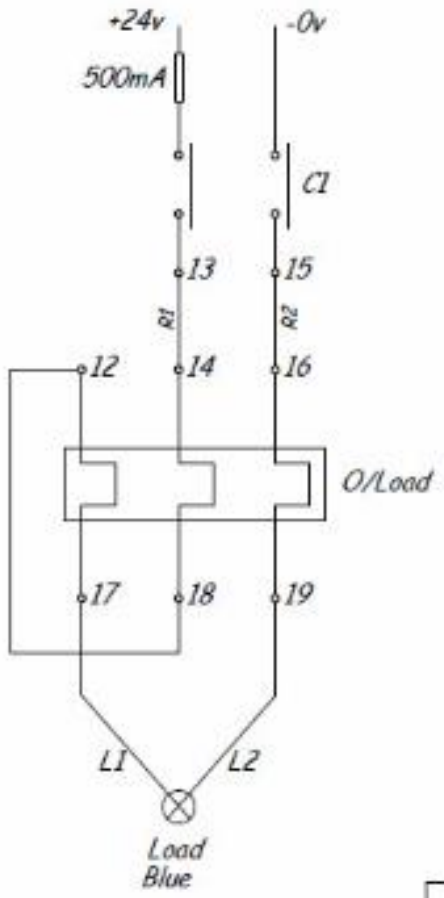


Basic Stop Start with Hold





A	B	C	D
DO NOT SCALE	IF IN ANY DOUBT–ASK		



24v Separate Supply From PSU

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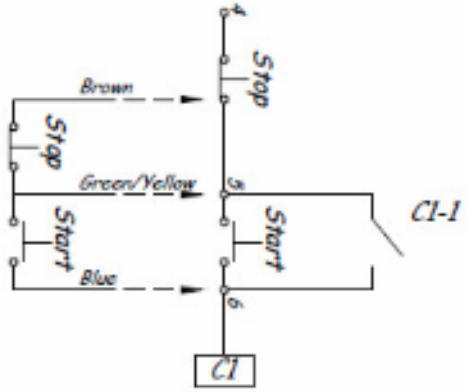
TOLERANCES	DESCRIPTION
DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED GENERAL TOLERANCE ±0.25mm ANGULAR DIMENSIONS ±1°	PHASE 1 ELECTRICAL DIRECT ONLINE STARTER LOAD CIRCUIT

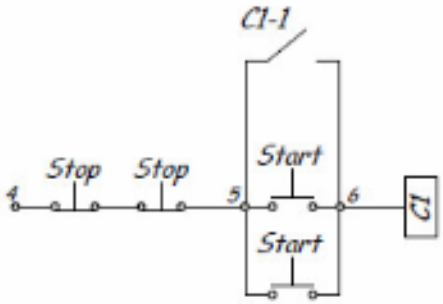
PROJECTION	NAME			
	PART Nº			
	MAT'L			
REPORT ANY ERRORS	FINISH			
	Nº OFF			

DRAWN	E.CODY	DATE	1/6/17	
SCALE	NTS	DWG Nº		REV
CHKD		SHEET	2 Of 3	A4

IRED	DATE	ALTERATION

A	B	C	D
DO NOT SCALE	IF IN ANY DOUBT—ASK		





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PROJECTION	NAME	TOLERANCES	DESCRIPTION
	PART Nº	DIMENSIONS ARE IN MILLIMETERS	PHASE 1 ELECTRICAL
	MAT'L	UNLESS OTHERWISE STATED GENERAL TOLERANCE ±0.25mm	DIRECT ONLINE STARTER—REMOTE CIRCUIT
REPORT ANY ERRORS	FINISH	ANGULAR DIMENSIONS ±1°	DRAWN E.CODY DATE 1/6/17
	Nº OFF		SCALE NTS DWG Nº REV
ORD DATE ALTERATION			CHKD SHEET 3 of 3 A4