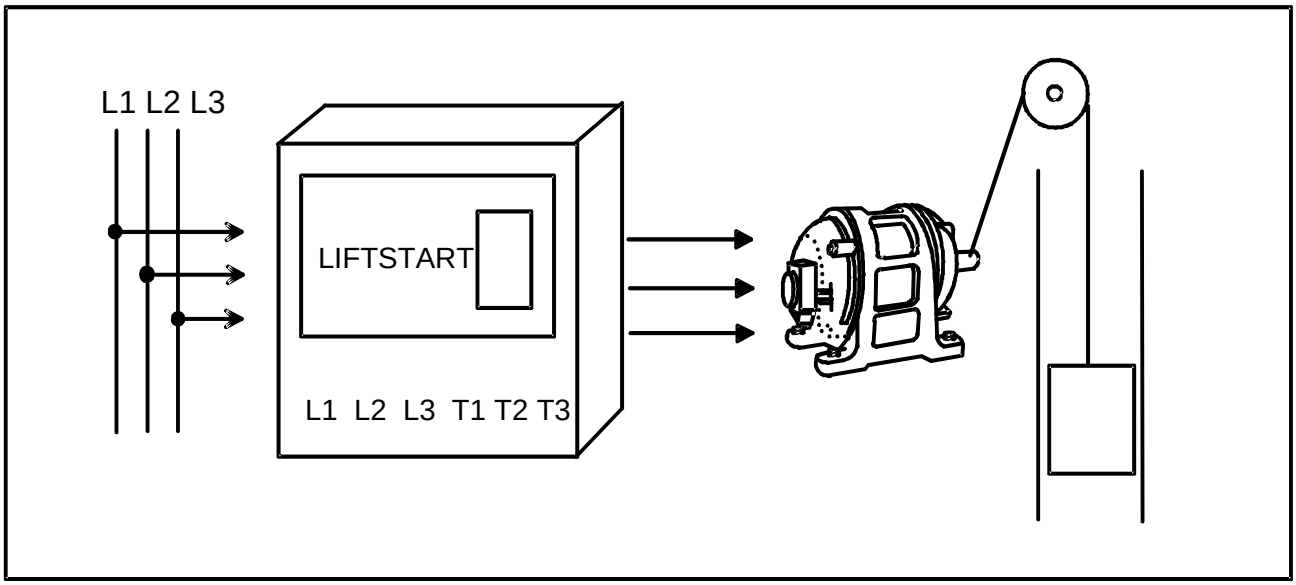
Operation Manual:

Electronic softstart system

LIFTSTART



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1. General hints:

The electronic softstarters "LIFTSTART" have been designed for starting and stopping three phase electric motors without risking of uneven or jerky starts and stops. This greatly reduces the wear on mechanical parts and prevents big current peak loads.
Starting and stopping the three phase motor without steps or transitions lengthens the life of powerdriven machine mechanical elements, greatly reducing stress on transmission and coupling parts.
The "LIFTSTART" range of solid state soft starters are electronic controlled 6 thyristors devices designed to provide progressive acceleration for 3 phase induction motors.

The electronic softstarters type LIFTSTART consist of two parts:

a) Power-unit (thyristor moduls)

b) Control-unit

2. Mounting instructions

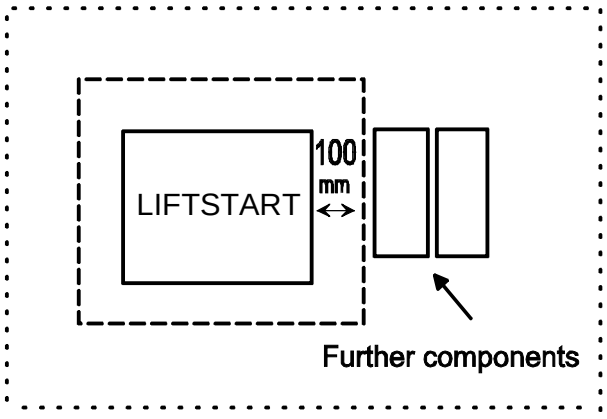
The LIFTSTART controller (IP 22) should be mounted vertically in a housing. The upper and lower side of the heatsink must be kept free to allow cooling air to circulate freely. Controllers with cooling fans must be mounted on a flat surface to ensure that cooling air is channelled to the heat sink.

Additional points must be considered when mounting the unit:

- Vibration free environment
- Protection against hazardous environments
- Protection against dust and humidity

Please avoid to mount other components in distance of 100mm around the controller because the cooling system can be affected.

Minimum clearance
around the controller
of 100mm.



3. Wiring

When wiring consider the following points to ensure correct and reliable operation.

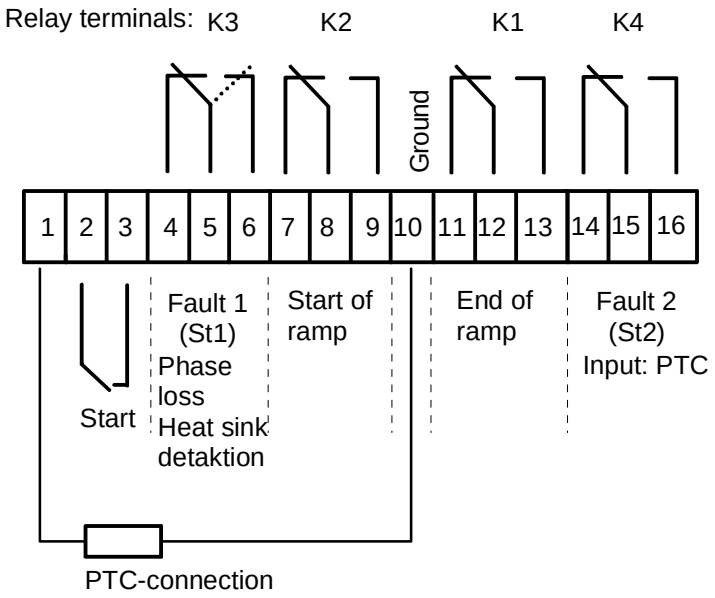
--> Hazardous voltage are present to the LIFTSTART during operation.
--> The operation of the softstarter with a capacitive load at the output (e.g. for power factor compensation) is not permissible.
--> Using an installation tester can damage the LIFTSTART
--> Connect the controller as shown in the following recommended connection.

Confirm the power side L1, L2 and L3 and motor side T1, T2 und T3
Take care of the following parts in regard to the control signals:
Install a surge suppressor on the relay exciting coil.
Use a shielded wirde for twisted wire for the control circuit wiring.
Distance this from the main circuit wiring.
High voltage wiring (L1, L2, L3, T1, T2, T3) should be physically and electrically separated from low voltage signal wires or control wires.
Only qualified persons should work on or near these controllers. The succesful and safe operation of these controllers is depended on proper transport, storage, planning and installing as well as commissioning.
Please regard established safety practices like VDE 0100, VDE 0113, VDE 160.

These electronic can effect the movement of dangerous machinery or moving constructions. The general safety precautions must be taken before putting into operation.

Fuses:
Conventional short circuit protection of the connections to the controller and to the motor in accordance with the wiring regulations must be provided. Circuit breakers, motor starters or additional fuses can be used. The control voltage should be protected with 2A.

Connection of control terminals:



Start (Enable):
Command: "START" connect terminal 2 to terminal 3.

Monitoring signal "End of ramp":
Terminals 12/11 switch to 12/13 (K1) (S2-Funktion).
Can use for switch on the briding contactor.

External control voltage:
230V 50/60Hz, terminals: look examples of standard wiring.

Over temperature:
The controller is fitted with a temperature control circuit. This continously monitors the temperature of the heat sink and should this rise above 75°C the LIFTSTART will shut down.
The red "Fault -LED St1" flashes and the terminals 5/6 switch to 5/4.

4. Commissioning instructions

Confirm that no parts have been damaged during shipping. When not using the LIFTSTART immediately after purchase, store it in a place with no dust and with good ventilation.
The adjusting and connection work are to be accomplished according with established safety practices.
For damages or accidents, caused by unsatisfactory installation or inexpert interferences in the Liftstart , the manufacturer can not be made liable.
The indicated mains voltage must agree with engine performance and the same applies also to the existing frequency.

Device connection:

The devices can be connected on either with the six-pole circuit of the three-phase motor (W3 - circuit) or between main and motor. (See example wirings)

The start instruction can be released via bridge from terminal 2 to terminal 3.

At LIFTSTART of the version "LIFTSTART X-6 TS ", thus with two separate contactors, activation is caused with creation of 230VAC-starting voltage. The two separation contactors pull up and activate by auxiliary contacts switched into row the electronic system of the LIFTSTART.

Diagnostic display (LED´s):

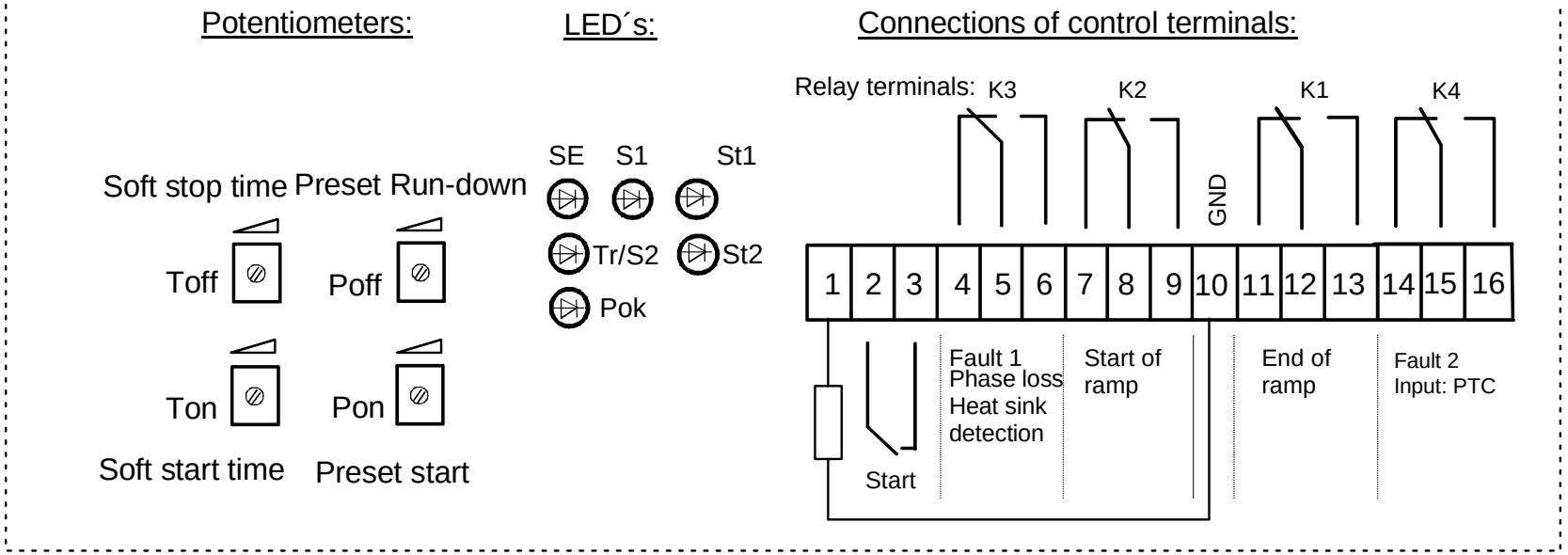
For announcement of the different functional states the LIFTSTART possesses 6 LED displays, which flash dependent on the respective condition of equipment.

Pok	Power o.k	(Control voltage available)
Tr	Top of ramp	(Softstart is finish)
SE	Start	(Enable of LIFTSTART)
S1	Drive running	(The LED flashs during the motor is running)
St2	Fault 2	(Flashs at PTC-detection)
St1	Fault 1	(Flashs at phase loss, undervoltage, heat sink overtemperature)

At fault 1 the operational status indicators Tr, SE and S1 expire.The LED "St1" flashes. The fault signal can be reset by connecting of the control voltage or main voltage or by activating of start. (RESET)

5. Connection diagramm

Control unit



Bedeutung der Potentiometer:

Ton	Soft start time	(2...8s)
Toff	Soft stop time	(2...8s)
Pon	Preset start	(0...90%)
Poff	Preset Run-down	(0...100%)

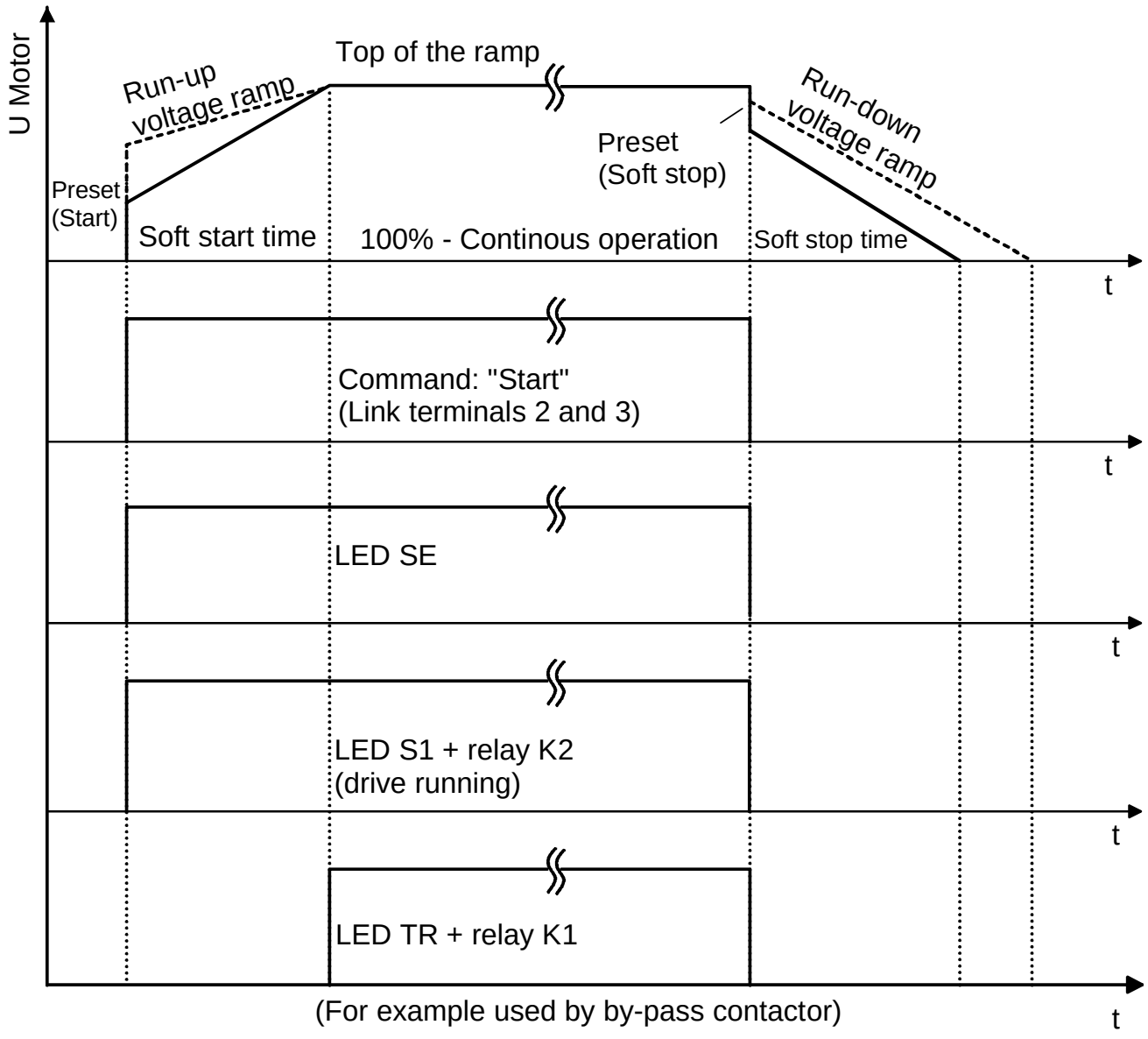
(other values can be implemented when desired)

Attention:
At fault (St1) terminals 4, 5, 6 the power unit will switched off.
Fault (St2) only one message spends. The power unit is not switched off.

LED´s:

Pok	(gn)	Power o.k.
SE	(gn)	Start (Enable of LIFTSTART)
Tr/S2	(gn)	Top of ramp (100%)
S1	(gn)	Softstarter is running
St1	(red)	Flaschs at phase loss, undervoltage, heat sink overtemperature and the relay contacts K3 switch from 5-4 to 5-6
St2	(red)	Fault-LED PTC-detection the relay contacts K4 switch from 15-14 to 15-16

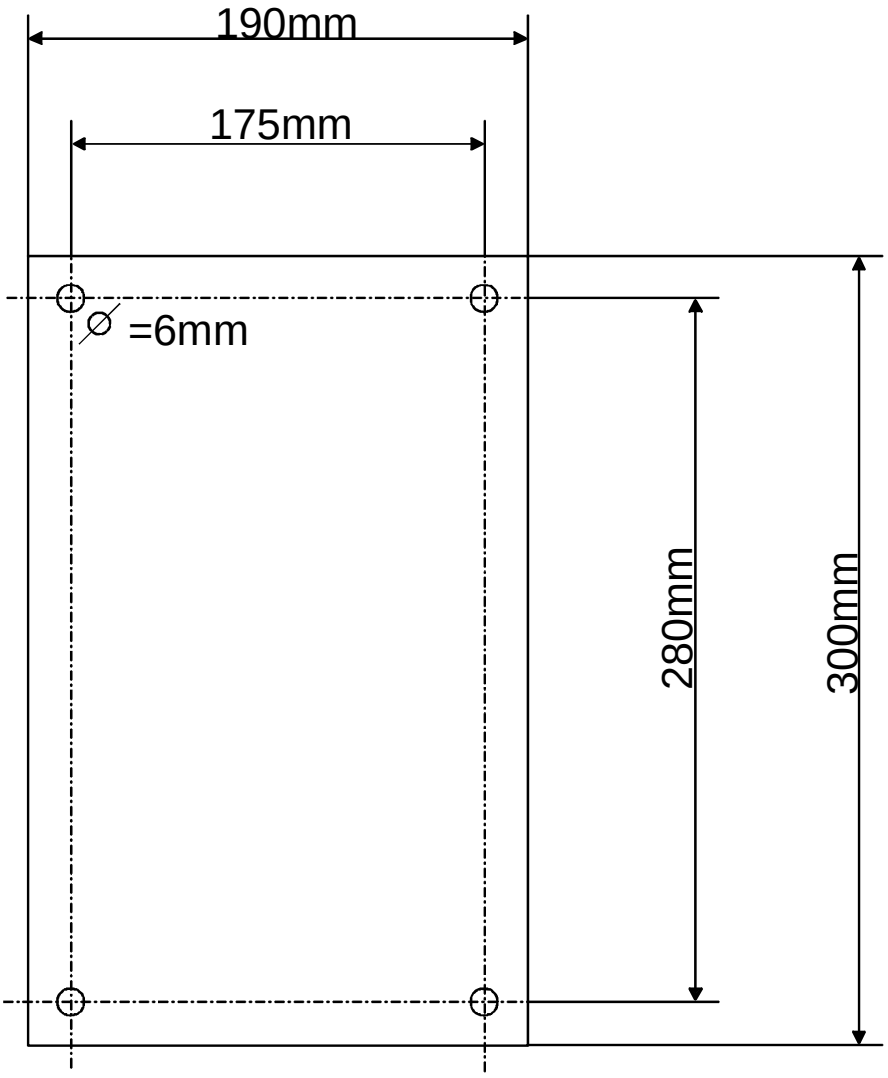
6. Modes of operation:

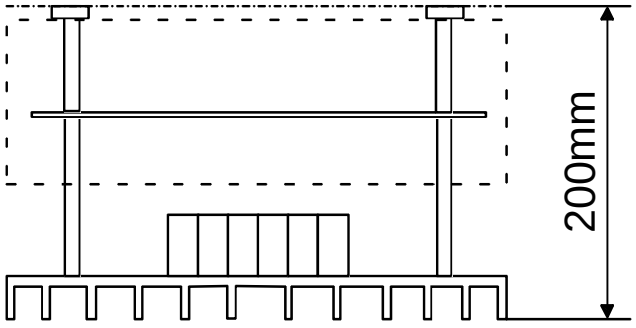


7.1. Outline drawing

List of LIFTSTARTS:
Size "A"

Liftstart 9...
Liftstart 12...
Liftstart 16...
Liftstart 24...
Liftstart 33...

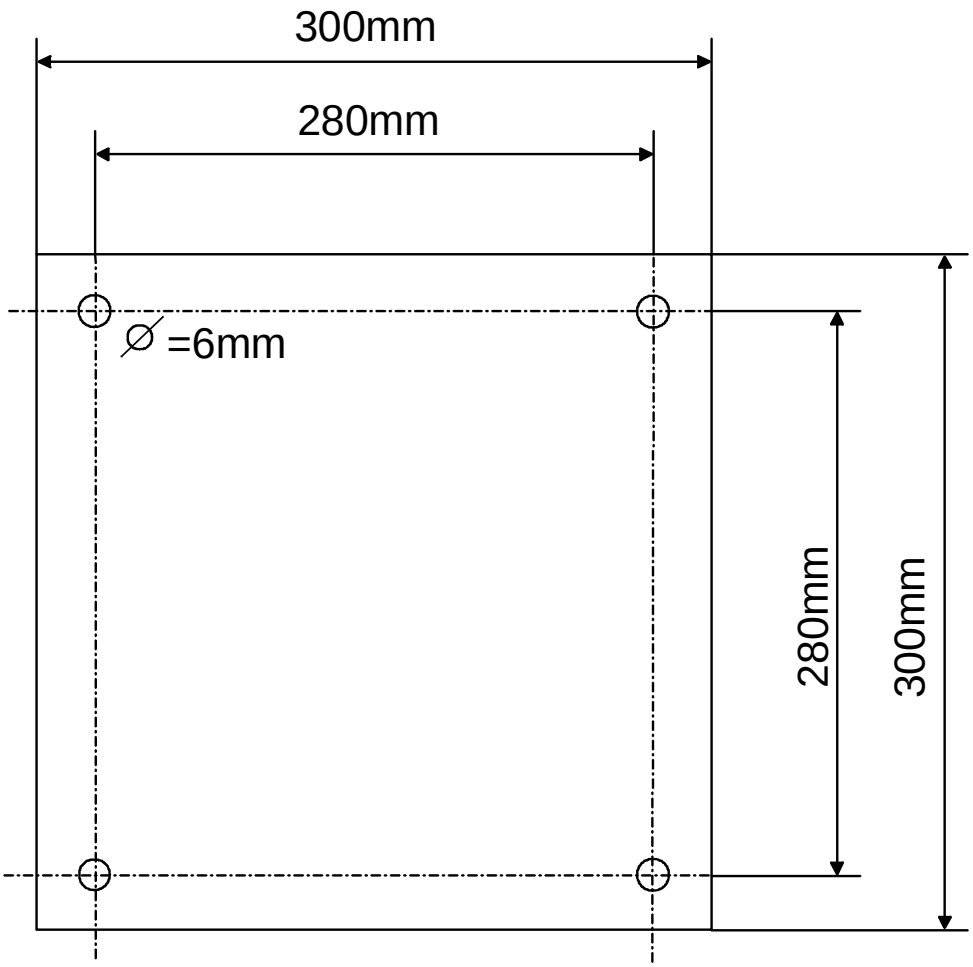


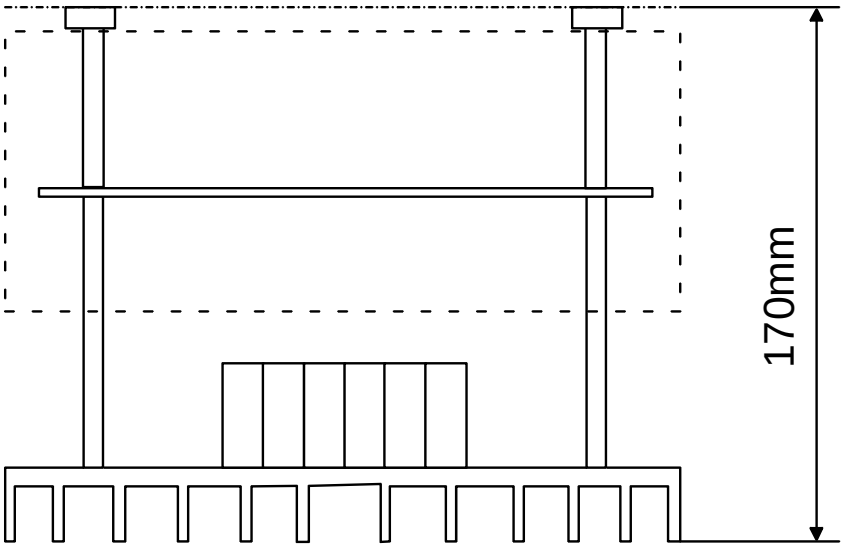


7.2. Outline drawing

List of LIFTSTARTS:
Size "B"

Liftstart 40...
Liftstart 60...

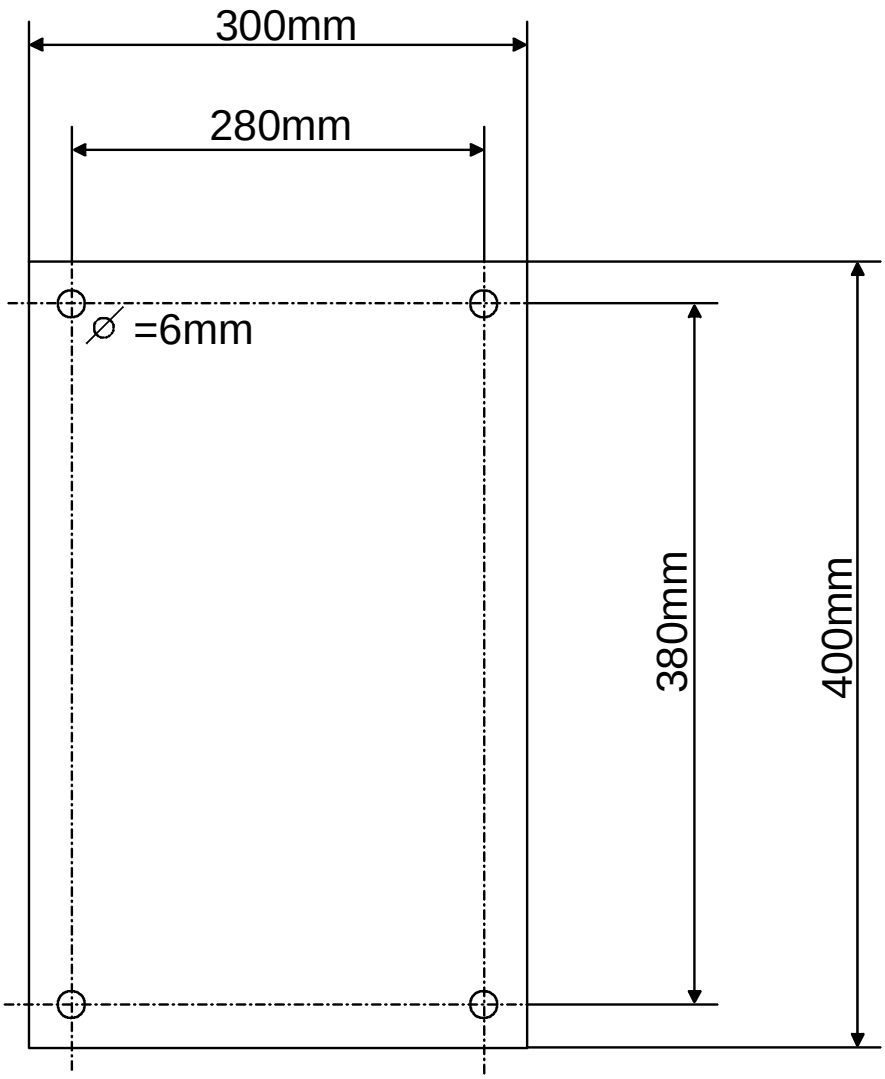


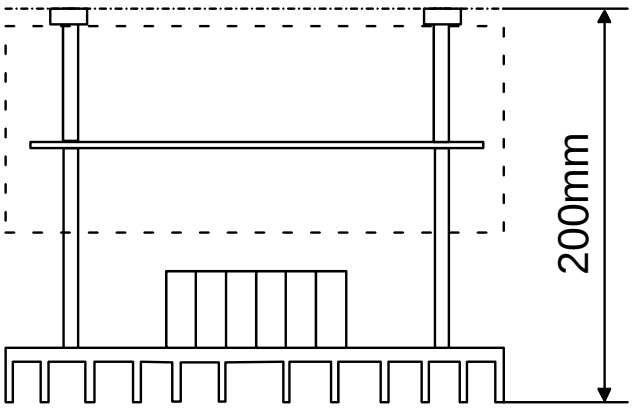


7.3. Outline drawing

List of LIFTSTARTS:
Size "C"

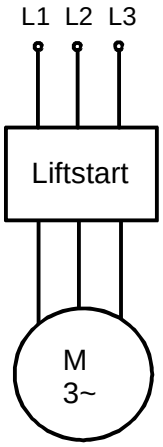
Liftstart 77...
Liftstart 90...





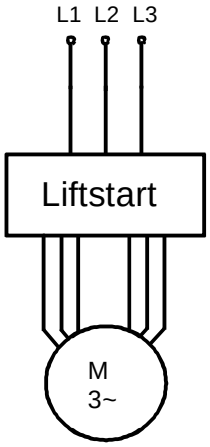
8. Available types of LIFTSTARTS

Liftstart ... -3



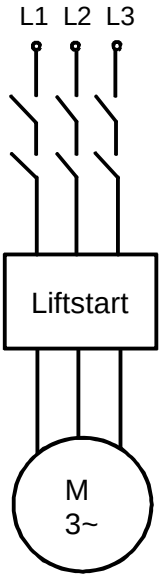
The Liftstart is placed between line and three-phase motor.

Liftstart ... -6



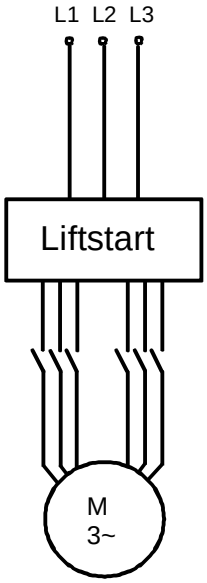
Six-clamps connection without seperation contactors.

Liftstart ... -3/TS



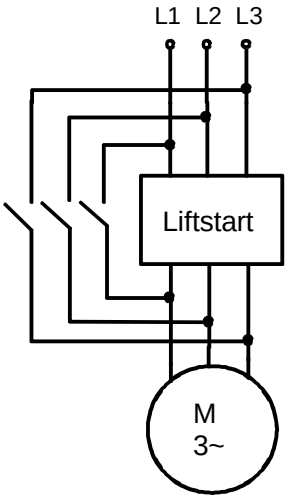
The Liftstart is connected between line and three-phase motor by two seperation contactors.

Liftstart ... -6/TS



Six-clamps connection of the Liftstart with two seperation contactors.

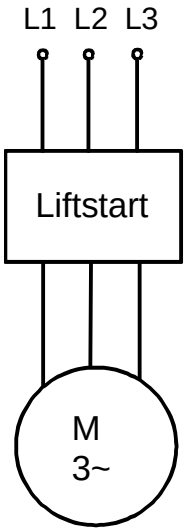
Liftstart ... -3/BY



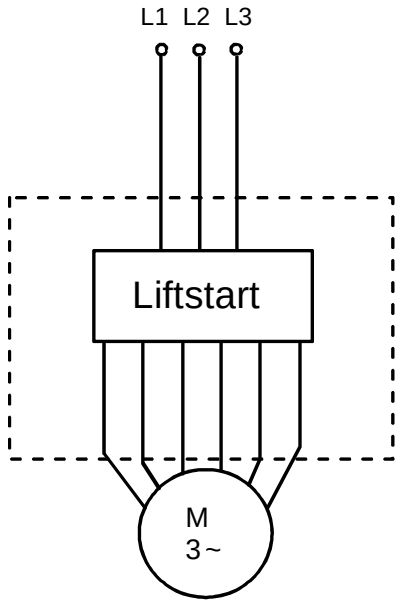
Completion of the Liftstart with integrated bypass contactors.

9. List of types:

Typ:	Size:	Motor power (kW)	Motor current (A)	max. Start current (A)	Numbers of starts / h	Recom. fast Semiconductor fuses	Wight (kg)	Wire sizes (mm²)	Recommended reactance coil
Liftstart 9-3	A	9	30	80	75	60A	3,5	4,0	NDR 36
Liftstart 12-3	A	12	42	110	75	60A	2,8	4,0	NDR 50
Liftstart 16-3	A	16	53	145	75	80A	4,0	6,0	NDR 50
Liftstart 24-3	A	24	68	220	75	100A	4,2	10,0	NDR 75
Liftstart 33-3	A	33	76	300	75	125A	5,5	16,0	NDR 75
Liftstart 40-3	B	40	110	360	75	200A	5,9	25,0	NDR 120
Liftstart 60-3	B	60	138	480	75	250A	6,4	35,0	NDR 160
Liftstart 77-3	C	77	180	600	40	400A	8,5	50,0	NDR 220
Liftstart 90-3	C	90	220	750	30	500A	10,2	70,0	NDR 220



Typ:	Size:	Motor power (kW)		Motor current (A)		max. Start current (A) W3-circuit	Number ofr Starts / h	Recom. fast semiconduktor fuses	Weight (kg)	Wire sizes (mm²)		Recommended reactance coil
		3-pole connection	W3-circuit	3-pole connection (like Liftstart...3)	W3-circuit					Input 3-wire connec-tion	Output 6-wire connec-tion	
Liftstart 9-6	A	9	12	30	50	110	75	60A	3,6	4,0	4,0	NDR 50
Liftstart 12-6	A	12	16	42	70	145	75	60A	3,0	6,0	4,0	NDR 75
Liftstart 16-6	A	16	24	53	100	220	75	80A	4,2	10,0	6,0	NDR 100
Liftstart 24-6	A	24	33	68	120	290	75	100A	4,5	16,0	10,0	NDR 120
Liftstart 33-6	A	33	40	76	130	360	75	125A	6,0	25,0	16,0	NDR 160
Liftstart 40-6	B	40	60	110	190	480	75	200A	6,3	35,0	25,0	NDR 220
Liftstart 60-6	B	60	77	138	235	600	40	250A	7,0	50,0	35,0	NDR 280
Liftstart 77-6	C	77	90	180	310	750	30	400A	9,0	70,0	50,0	NDR 350
Liftstart 90-6	C	90	125	220	380	900	30	500A	10,5	95,0	70,0	NDR 420

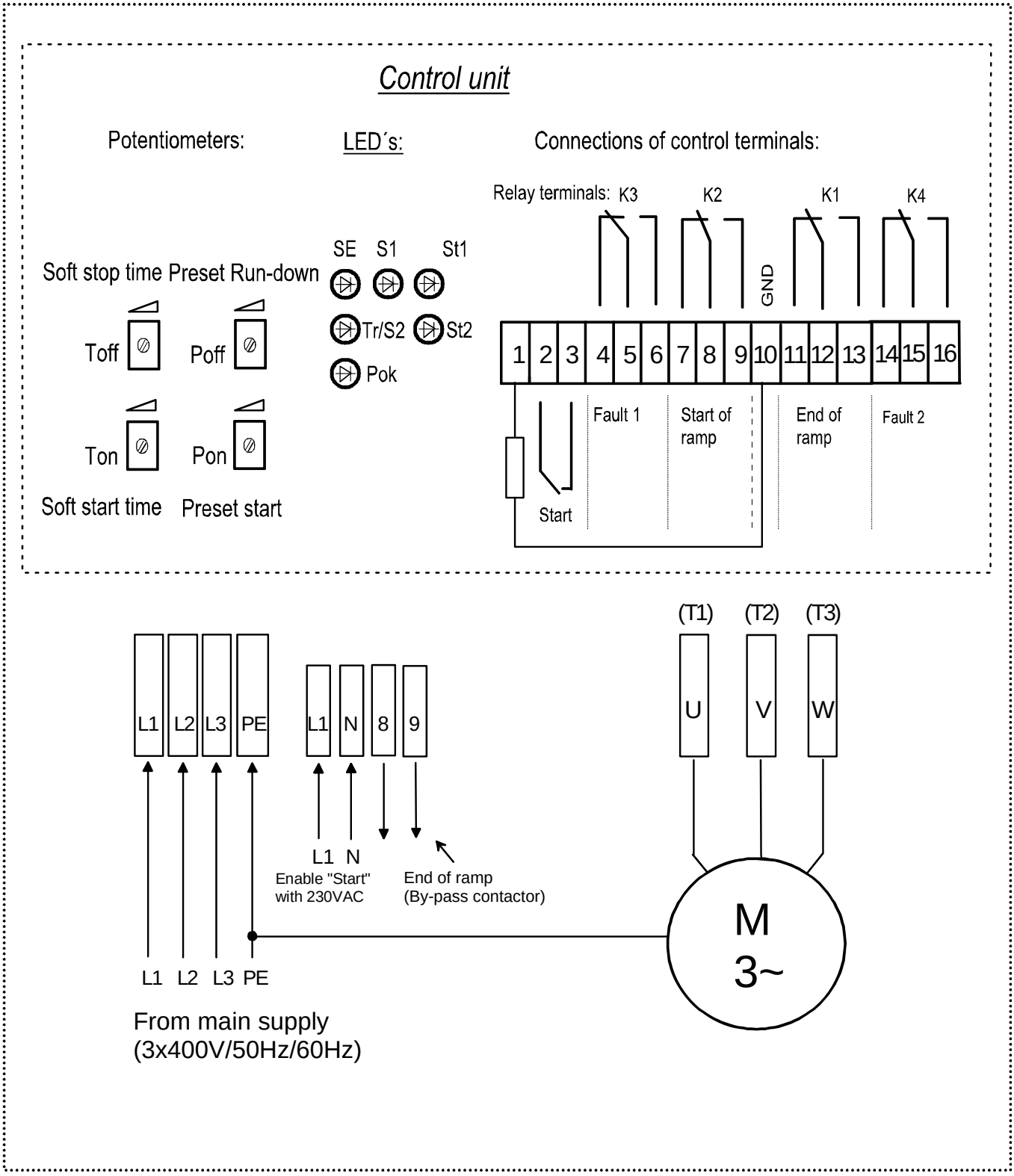


The specified values are approximate values. These can deviate in practice.

10. Technical data:

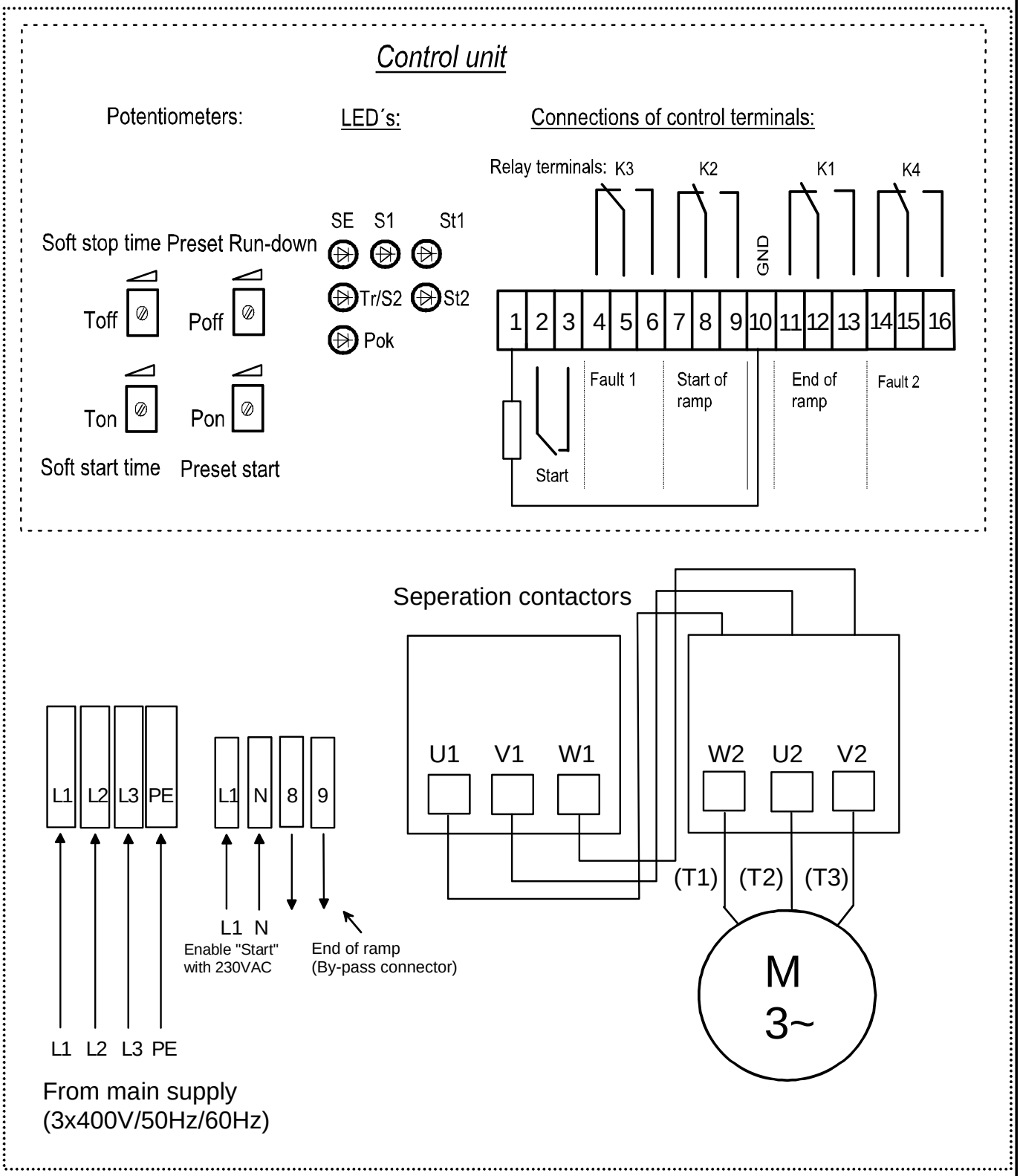
Rated voltage:	3x400VAC (-15...+15%)
Control voltage:	400V/230VAC (-15...+15%)
Frequency:	45Hz...65Hz (self adjustment)
Controlled Phases:	3 (L1, L2, L3)
Operating temperature:	-20°…55°C normal operation)
Relative humidity:	95% (without condensation)
Max. altitude:	1500m
Control outputs:	250VAC / 8A or 24VDC / 3A (loads of relay contacts)
Monitor of faults:	heat sink over temperature > 75°C PTC-detection Phase loss Undervoltage
Mounting position:	vertical, power terminals at bottom
Control inputs:	separated galvanically
Relevant standards:	EN60947-4-2 (1996) EN55011, EN61000-4-2… EN50178 CE conformity
Safety class system:	IEC 536 (1976)
Protection:	IP22 (EN60529

11.1. Basic connections: Liftstart 9-3 to Liftstart 60-3



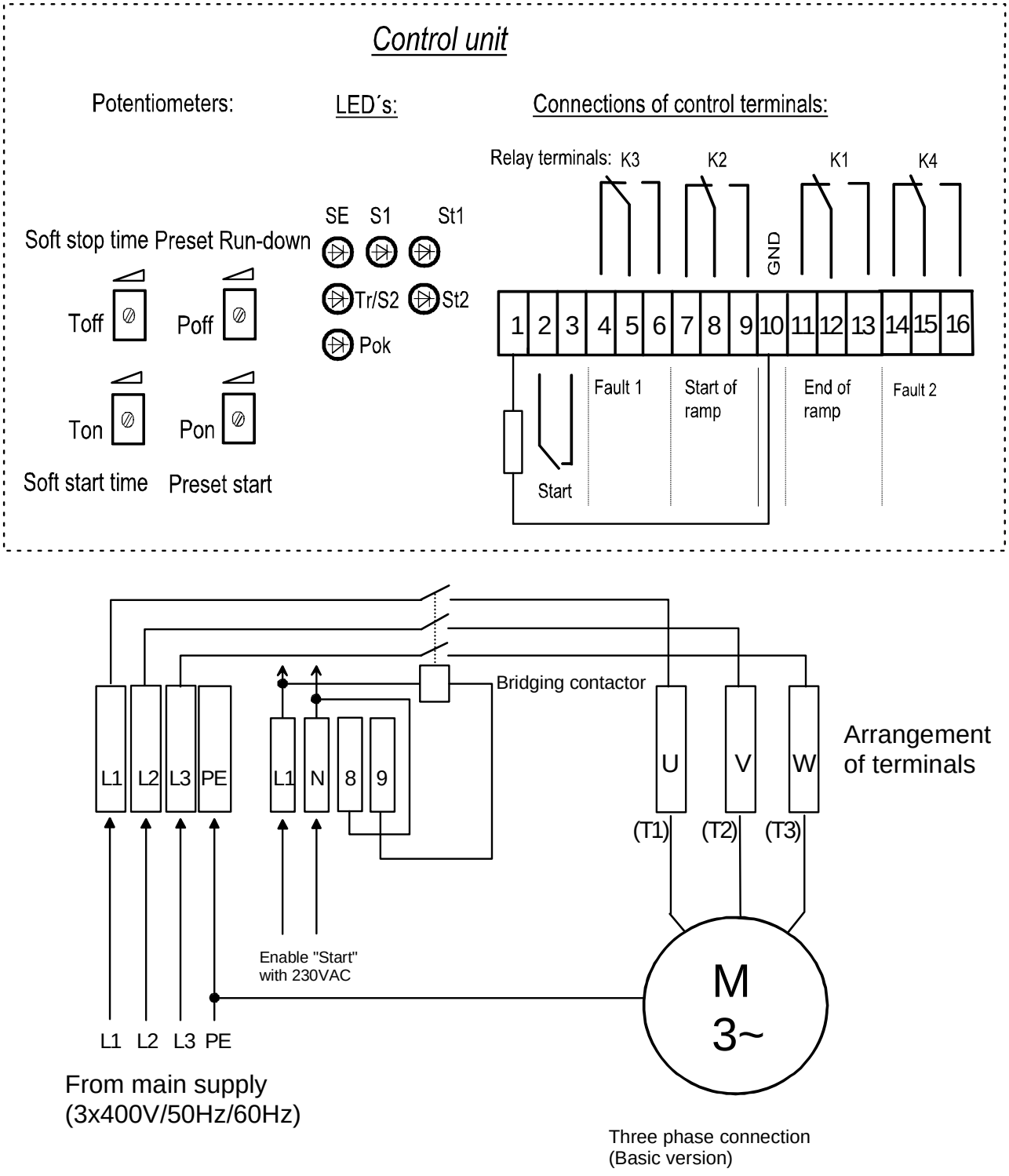
The main circuits are connected to the clamps L1, L2 and L3.The output of the Liftstart are to connected with the clamping links U, V, W (T1, T2, T3).

11.2. Basic connections: Liftstart 9-3/TS to Liftstart 60-3/TS



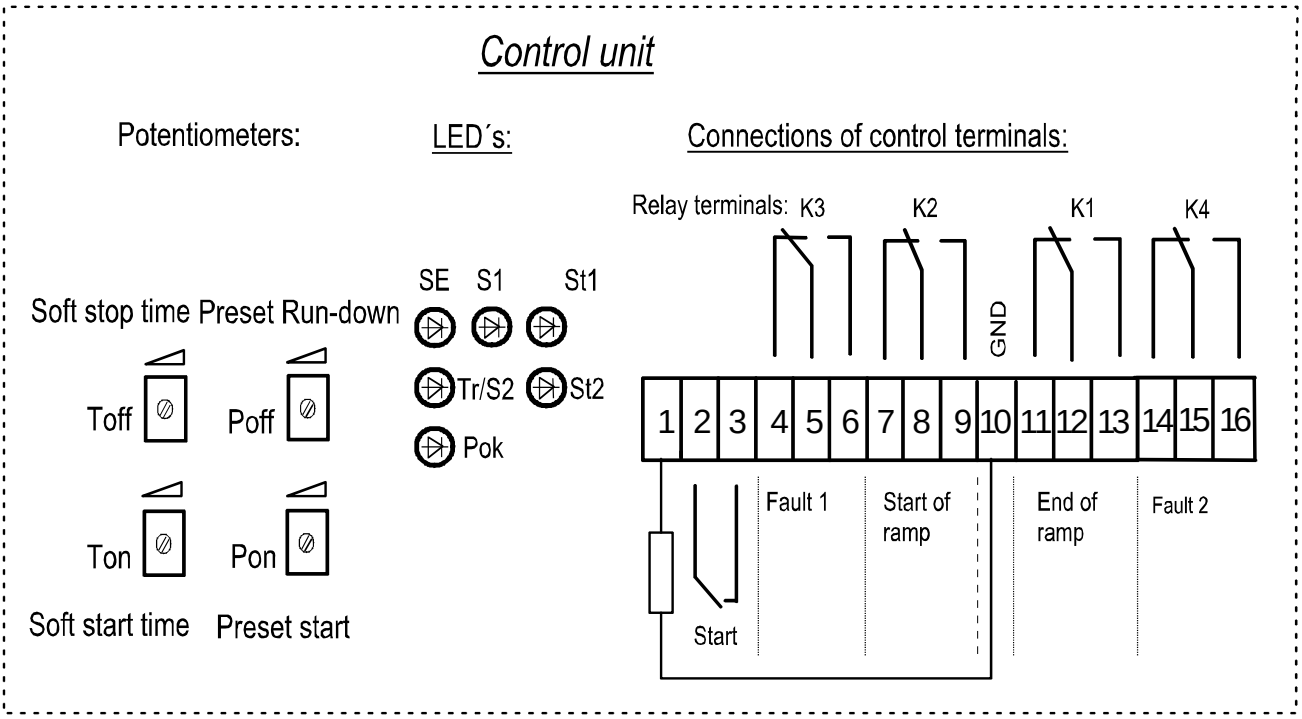
The main circuits are connected to the clamps L1, L2 and L3. The outputs of the LIFT-START are to connected with the clamping links U (T1), V (T2), W (T3).

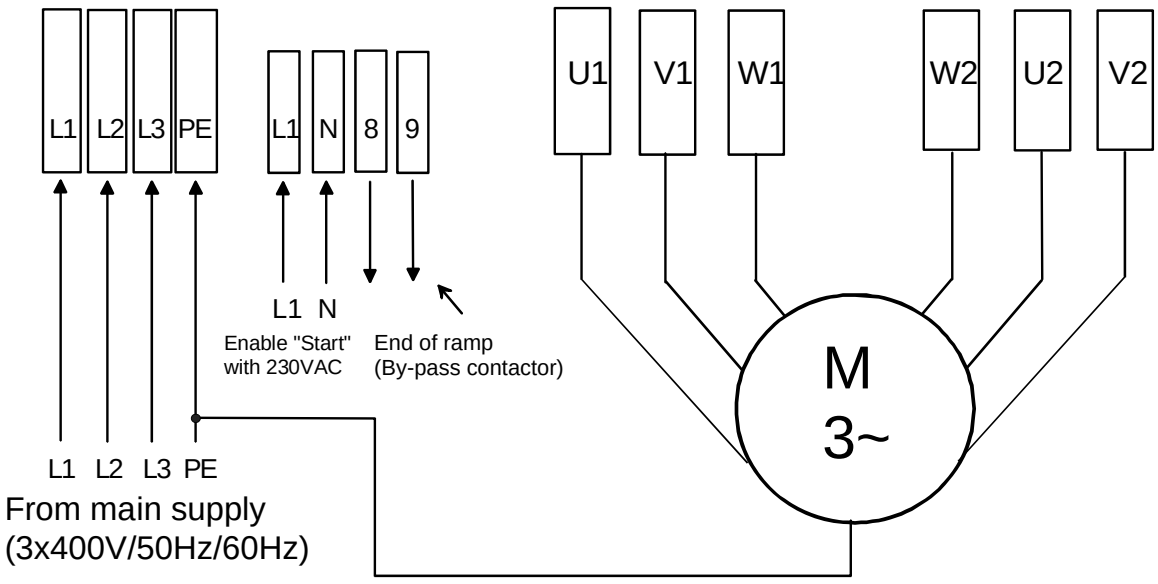
11.3. Basic connectors: Liftstart 9-3/BY to Liftstart 60-3/BY



The main circuits are connected to the clamps L1, L2 and L3. The outputs of the LIFT-START are to connected with the clamping links U (T1), V (T2), W (T3).

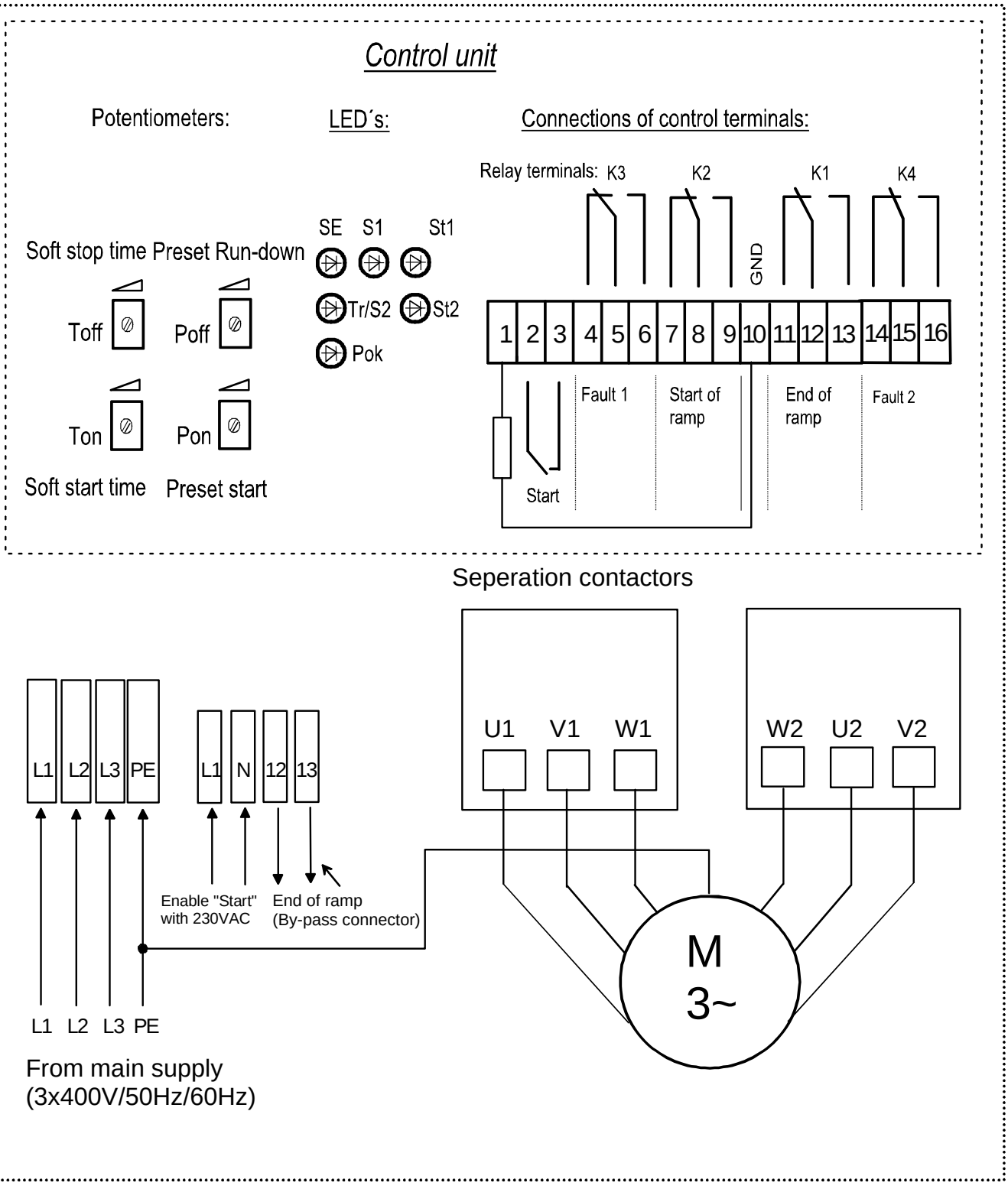
11.4. Basic connection: Liftstart 9-6 to Liftstart 60-6





The main circuits are connected to the clamps L1, L2 and L3. The output of the LIFTSTART are to connected with the clamping links U1, V1, W1, U2, V2, W2.

11.5. Basic connections: Liftstart 9-6/TS to Liftstart 60-6/TS



The main circuits are connected to the clamps L1, L2 and L3. The outputs of the LIFT-START have to be connected with the clamping links U1,V1,W1,W2,V2 and U2.