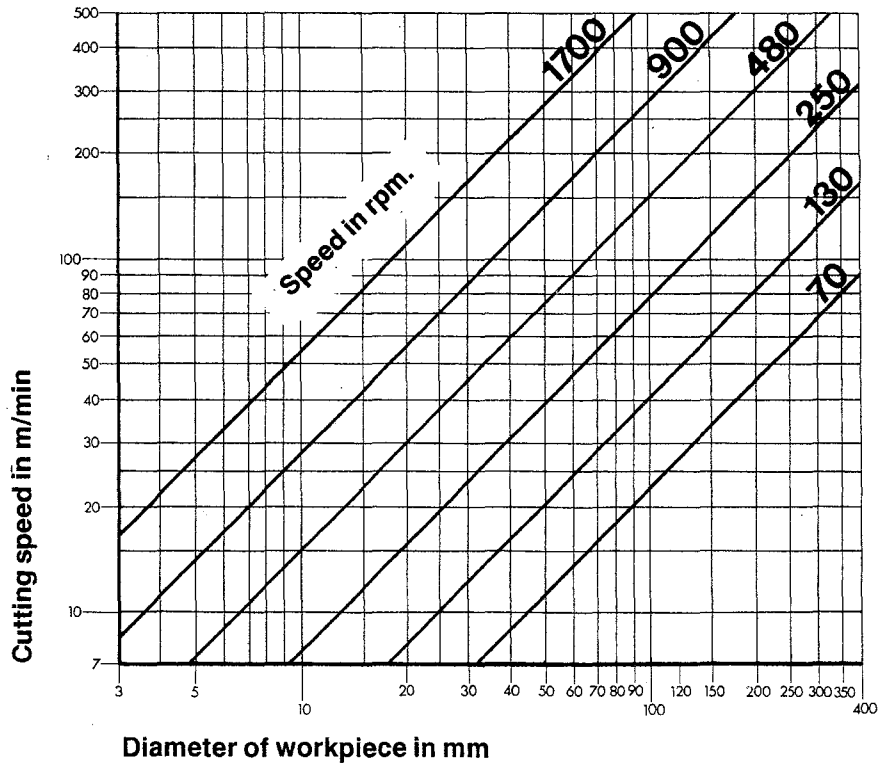
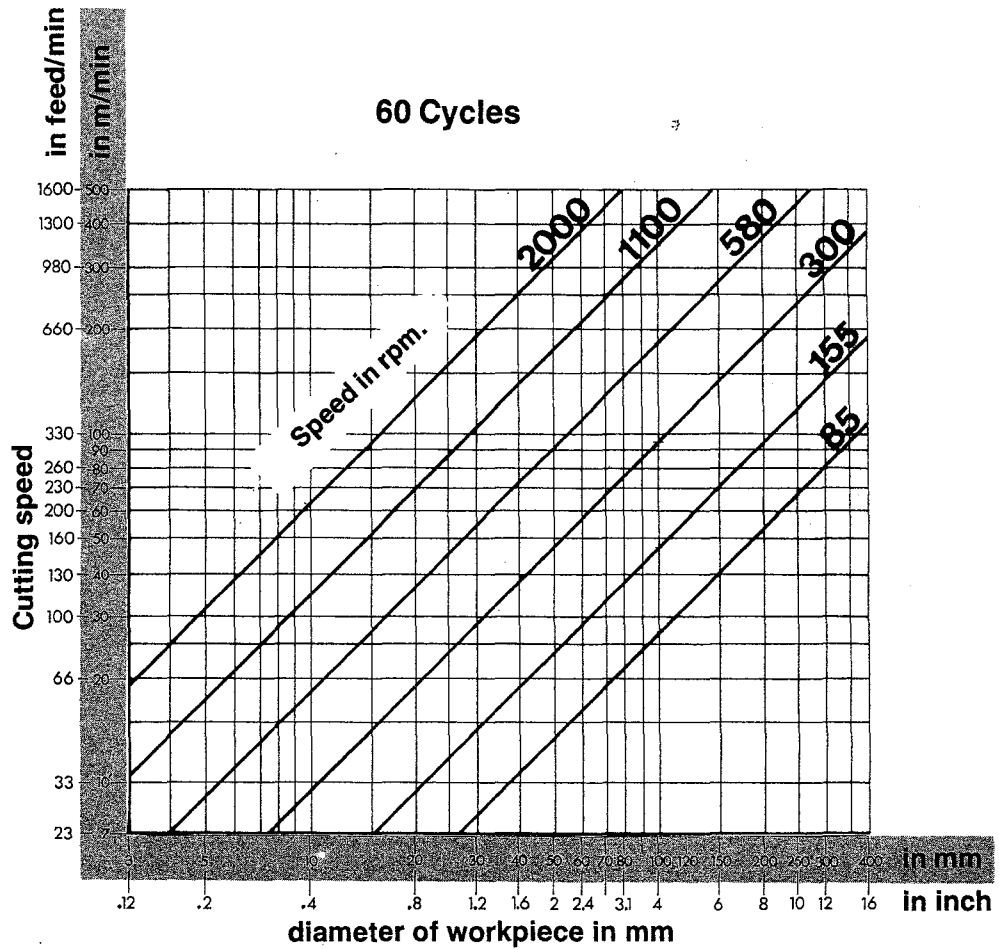


Cutting Speeds

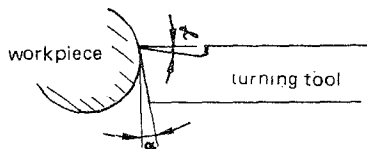
50 Cycles



60 Cycles



Approximate values for cutting speed – Cutting angle – Lubricant



Values valid for dry cutting with:

High - speed steel tools for cutting speed v_{60} (age 60min.)

Carbon tipped tools for cutting speed v_{240} (age 240min.)

Side angle $\chi = 45^\circ$, point angle $\xi = 90^\circ$, angle of inclination

$\lambda = 0 \dots 8^\circ$,

for light alloy and plastic $\lambda = 5 \dots 10^\circ$.

Cutting speed

These values hold good for cuts up to 2mm deep, over 2mm the cutting speed should be reduced by 10 - 20%.

¹⁾ SS = high speed steel S₁ H₁ G₁ = tipped tools E = Cutting emulsion P = paraffin L = air

Workpiece material	Tensile strength in kp/mm ²	¹⁾ Tool	Cutting angle clearance/top		Feed in mm/rev.				Coolant and Lubricant	
			α°	γ°	0,1	0,2	0,4	0,8	Roughing	Finishing
					cutting speed v m/min					
Steel St 34, St 37, St 42	up to 50	SS	8	14		60	45	34	E	E or P
		S ₁	5	10	280	236	200	170		
St 50, St 60	50...70	SS	8	14		44	32	24	E	E or P
		S ₁	5	10	240	205	175	145		
St 70	70...85	SS	8	14		32	24	18	E	E or P
		S ₁	5	10	200	170	132	106		
Cast steel	50...70	SS	8	10		34	25	19	E	dry
		S ₁	5	6	118	100	85	71		
Alloyed steel	85...100	SS	8	10		24	17	12	E	E or P
		S ₁	5	6	150	118	95	75		
Mn-Steel, Cr-Ni-steel, Cr-Mo-steel	100...140	SS	8	6		16	11	8	E	E or P
		S ₁	5	6	95	75	60	50		
other alloyed steels	140...180	SS	8	6		9,5	6		E	E or P
		S ₁	5	6	60	48	38	32		
Tool steel	150...180	SS	8	6					E	Colza oil or P
		S ₁	5	6	50	40	32	27		
C.I.20,C.I.25	hardness Brinell 200...250	SS	8	0		32	18	13	dry or E	dry
		H ₁	5	0	106	90	75	63		
Copper alloys	hardness Brinell 80...120	SS	8	0		125	85	56	dry, E or L	dry
		G ₁	5	6	600	530	450	400		
Cast bronze		SS	8	0		63	53	43	E or L	dry
		G ₁	5	6	355	280	236	200		
Light alloys aluminium		SS	12	30		400	300	200	E or P	E or P
		G ₁	12	30	1320	1120	950	850		
Aluminium alloys (11...13%Si)		SS	12	18		100	67	45	E	Oil S II or P
		G ₁	12	18	224	190	160	140		
Magnesium alloys*		SS	8	6		1000	900	800	dry or with non-combustible oil	dry or with non-combustible oil
		G ₁	5	6	1800	1500	1250	1060		
Platics and hard rubber		SS	12	10					dry	dry
		G ₁	12	10	300	280	250	224		
Bakelite, Novotext, Pertinax hard plastic		SS	12	14					dry	dry
		G ₁	12	14	280	212	170	132		

* Do not use with water or water mixtures (DANGER OF FIRE!)

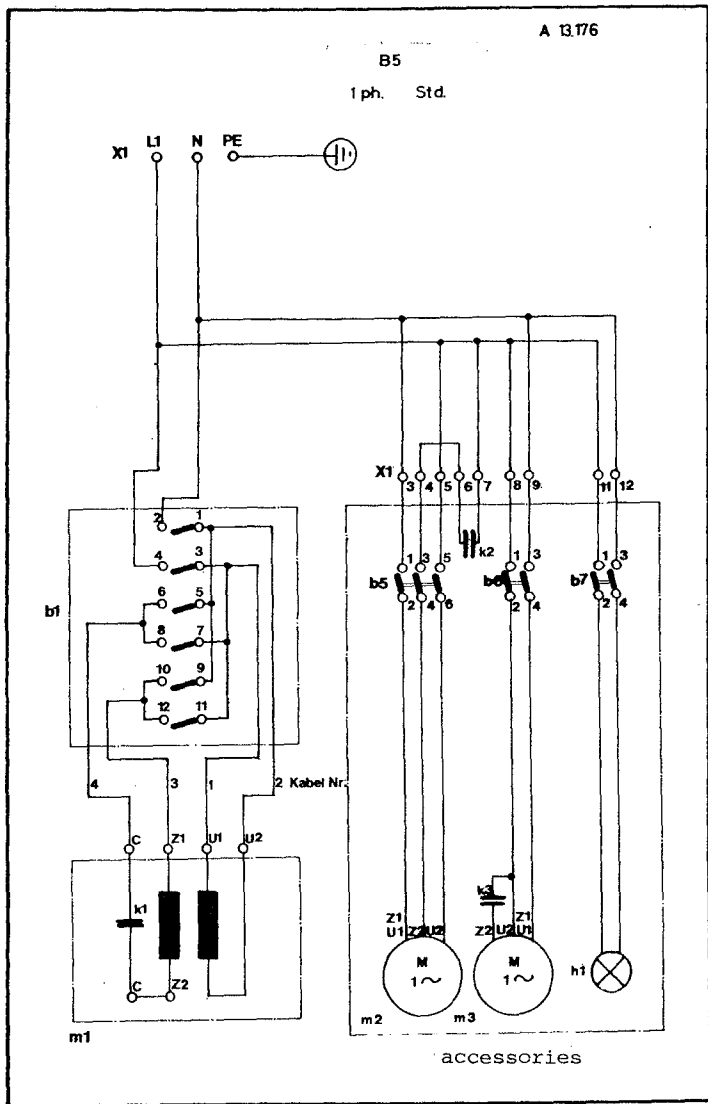
Circuit Diagrams

Electrical Equipments

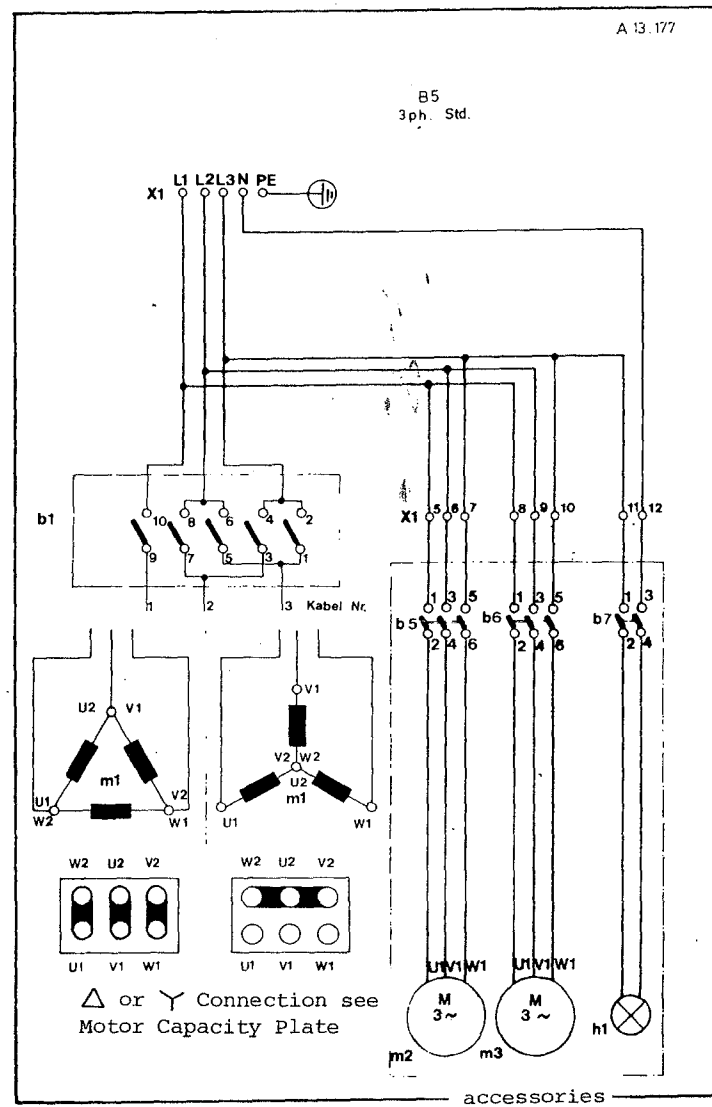
Connection Scheme

Standard-Electric Version

Wiring diagram -- single-phase



Wiring diagram -- three-phase



I) Electrical Equipment Standard-Electric
Version COMPACT 10

- b1 Main motor switch
 k1 Condenser main motor (only single phase)
 x1 Clamping strip
 m1 Main motor
 b5 Motor switch vertical unit
 b6 Motor switch coolant pump
 b7 Switch machine lamp
 h1 Machine lamp
 k2 Condenser vertical motor
 k3 Condenser coolant pump
 m2 Motor vertical unit
 m3 Motor coolant pump

} Accessories

SINGLE-PHASE CONNECTION

X1 Clamping strip

Main motor

- L1(1) Phase R
 N(2) Neutral wire
 PE Grounding wire S1
 (connected to
 grounding strip)

Vertical unit

- 3 Phase R (wire no. 1)
 4 Phase S (wire no. 2)
 5 Phase T (wire no. 3)
 6 Condenser vertical
 unit
 7 Condenser vertical
 unit

Coolant pump

- 8 Phase R
 9 Neutral wire
 10

Machine lamp

- 11 Phase R
 12 Neutral wire N

Note: the grounding wires are
 connected to the grounding
 strip.

THREE-PHASE CONNECTION

X1 Clamping strip

Main motor

- L1(1) Phase R
 L2(2) Phase S
 L3(3) Phase T
 N(4) Neutral wire N
 PE Grounding wire S1
 (connected to
 grounding strip)

Vertical unit

- 5 Phase R (wire no. 1)
 6 Phase S (wire no. 2)
 7 Phase T (wire no. 3)

Coolant pump

- 8 Phase R
 9 Phase S
 10 Phase T

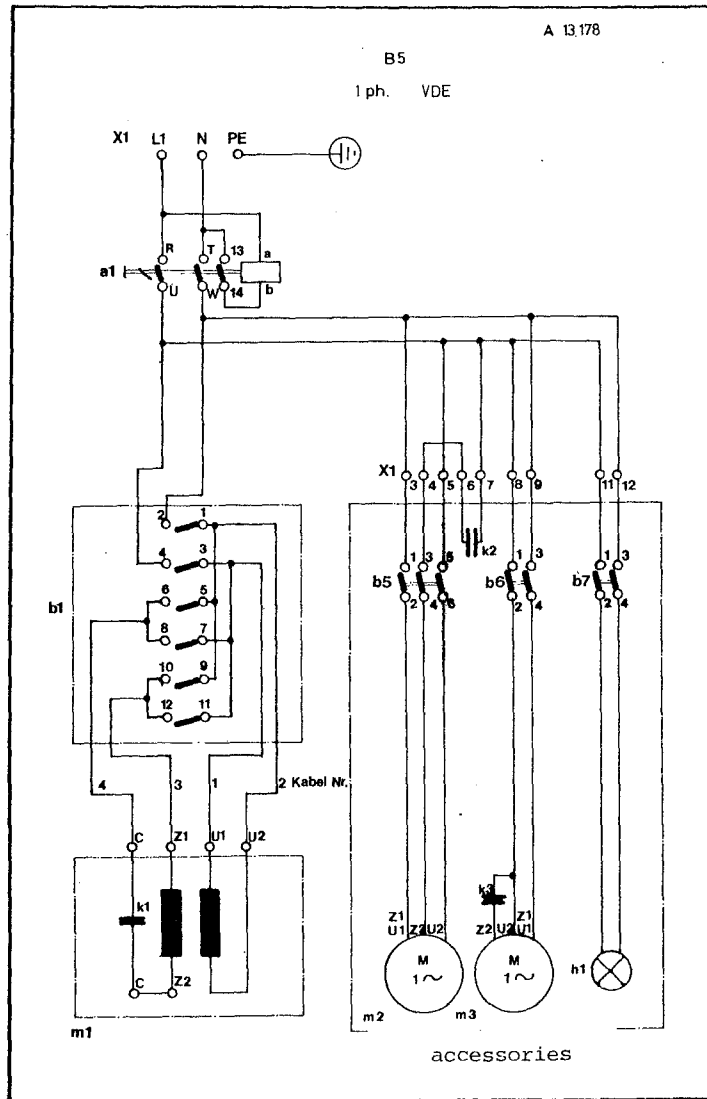
Machine lamp

- 11 Phase R
 12 Neutral wire N

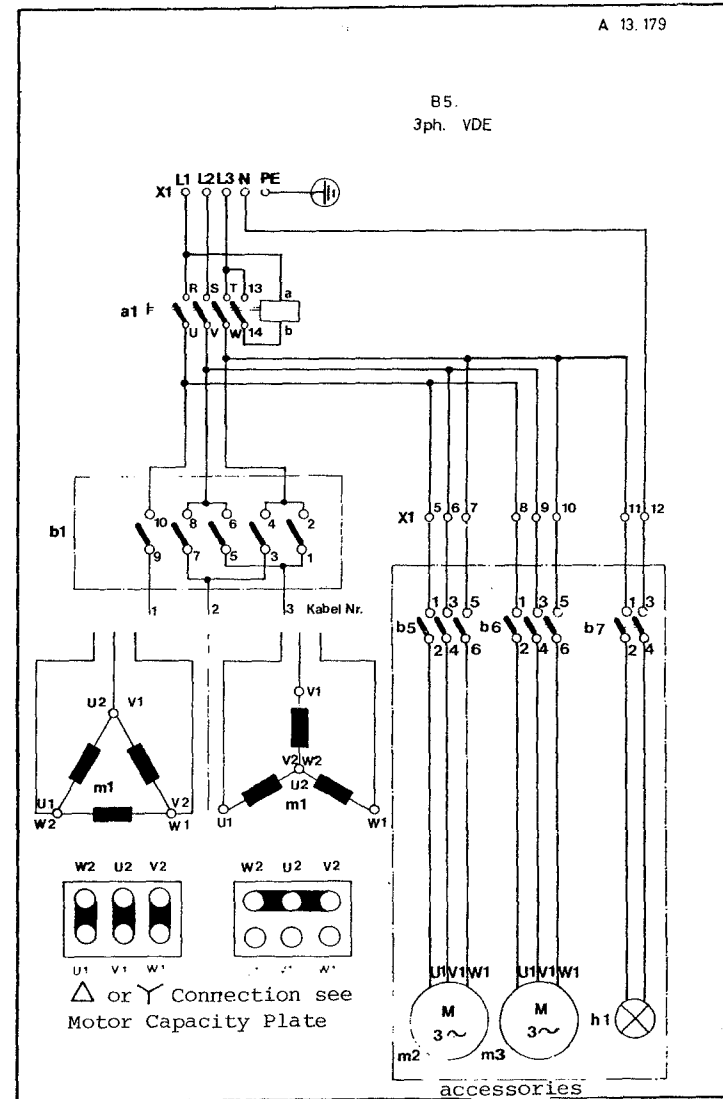
Note: the grounding wires are
 connected to the grounding
 strip.

VDE-Electric Version

Wiring diagram – single-phase



Wiring diagram – three-phase



II) Electrical Equipment VDE-Electric Version
COMPACT 10

- a1 Main and emergency-off switch with low-volt release (c1 - main relay)
 - b1 Main motor switch
 - k1 Condenser main motor (only single phase)
 - x1 Clamping strip
 - m1 Main motor
 - b5 Motor switch vertical unit
 - b6 Motor switch coolant pump
 - b7 Switch machine lamp
 - h1 Machine lamp
 - k2 Condenser vertical motor
 - k3 Condenser coolant pump
 - m2 Motor vertical unit
 - m3 Motor coolant pump
- } Accessories

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SINGLE-PHASE CONNECTION

X1 Clamping strip

Main motor

- L1(1) Phase R
- N(2) Neutral wire
- PE Grounding wire S1
(connected to grounding strip)

Vertical unit

- 3 Phase R (wire no. 1)
- 4 Phase S (wire no. 2)
- 5 Phase T (wire no. 3)
- 6 Condenser vertical unit
- 7 Condenser vertical unit

Coolant pump

- 8 Phase R
- 9 Neutral wire
- 10

Machine lamp

- 11 Phase R
- 12 Neutral wire N

Note: the grounding wires are connected to the grounding strip.

THREE-PHASE CONNECTION

X1 Clamping strip

Main motor

- L1(1) Phase R
- L2(2) Phase S
- L3(3) Phase T
- N(4) Neutral wire N
- PE Grounding wire S1
(connected to grounding strip)

Vertical unit

- 5 Phase R (wire no. 1)
- 6 Phase S (wire no. 2)
- 7 Phase T (wire no. 3)

Coolant pump

- 8 Phase R
- 9 Phase S
- 10 Phase T

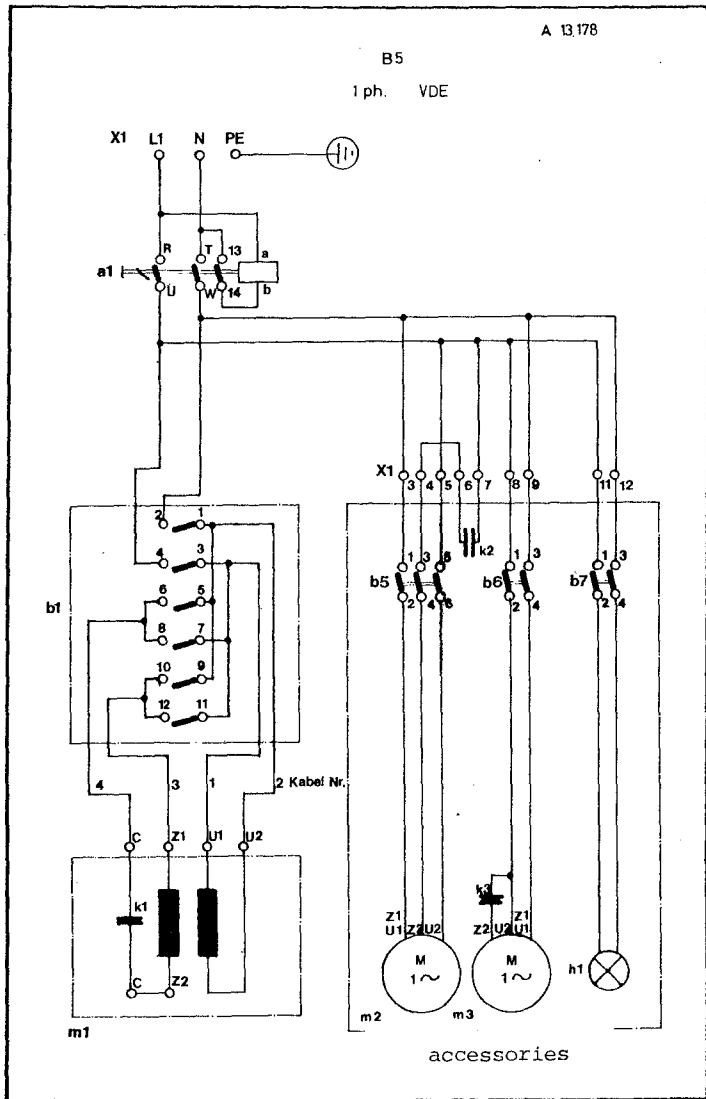
Machine lamp

- 11 Phase R
- 12 Neutral wire N

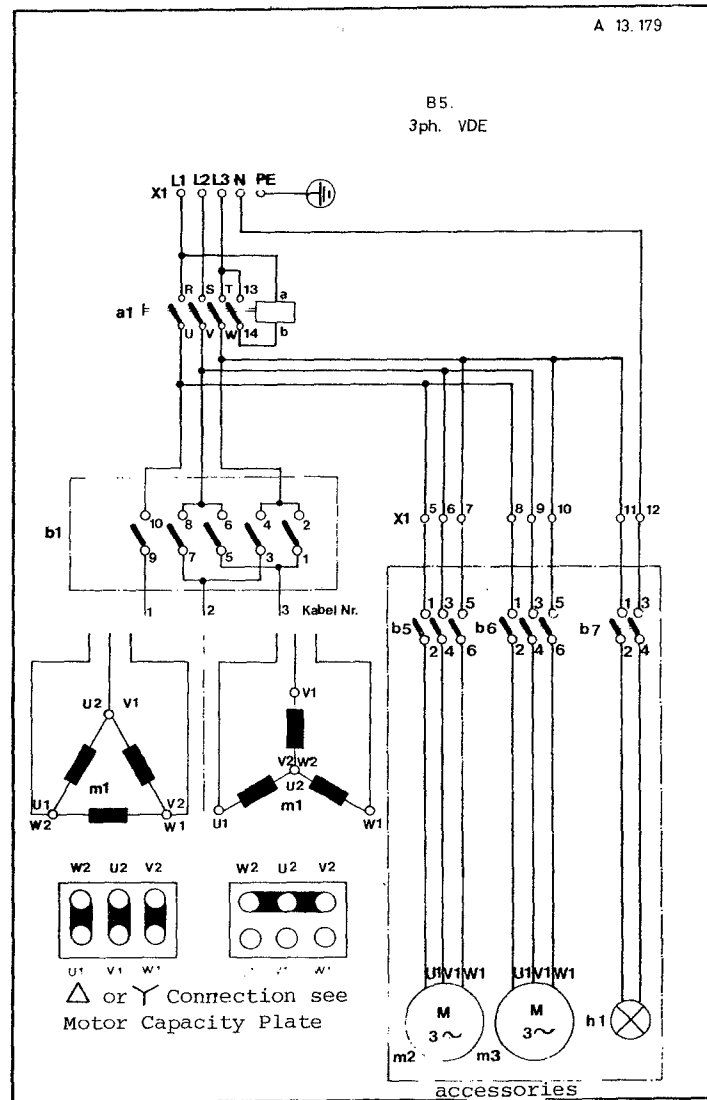
Note: the grounding wires are connected to the grounding strip.

VDE-Electric Version

Wiring diagram – single-phase

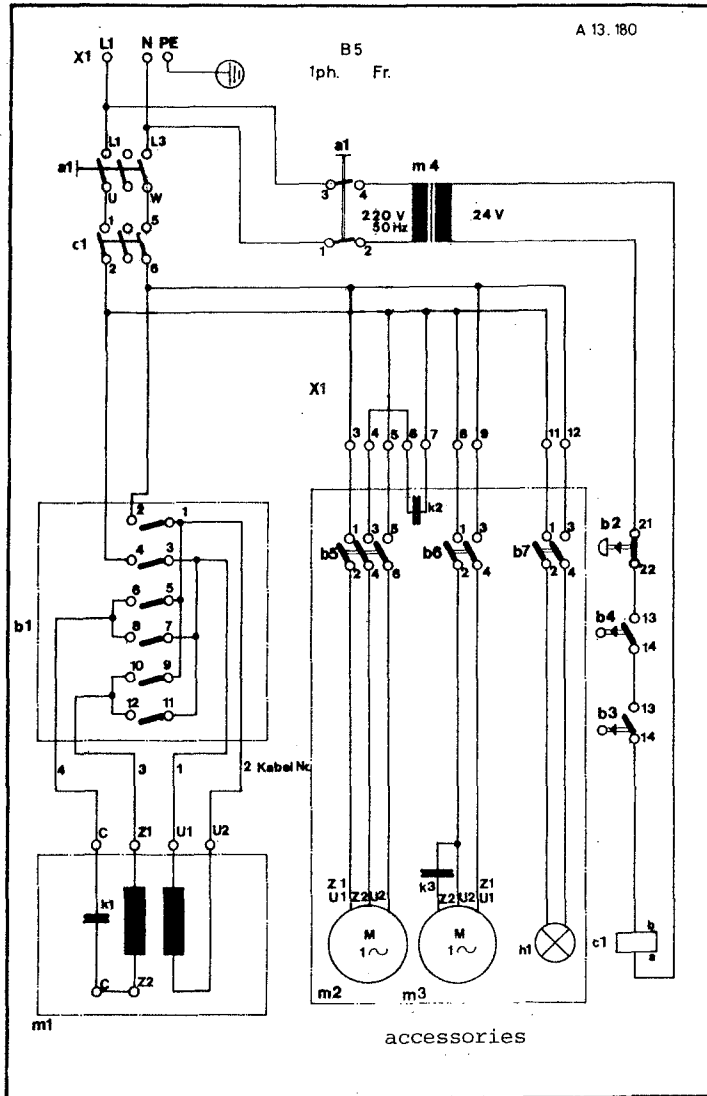


Wiring diagram – three-phase

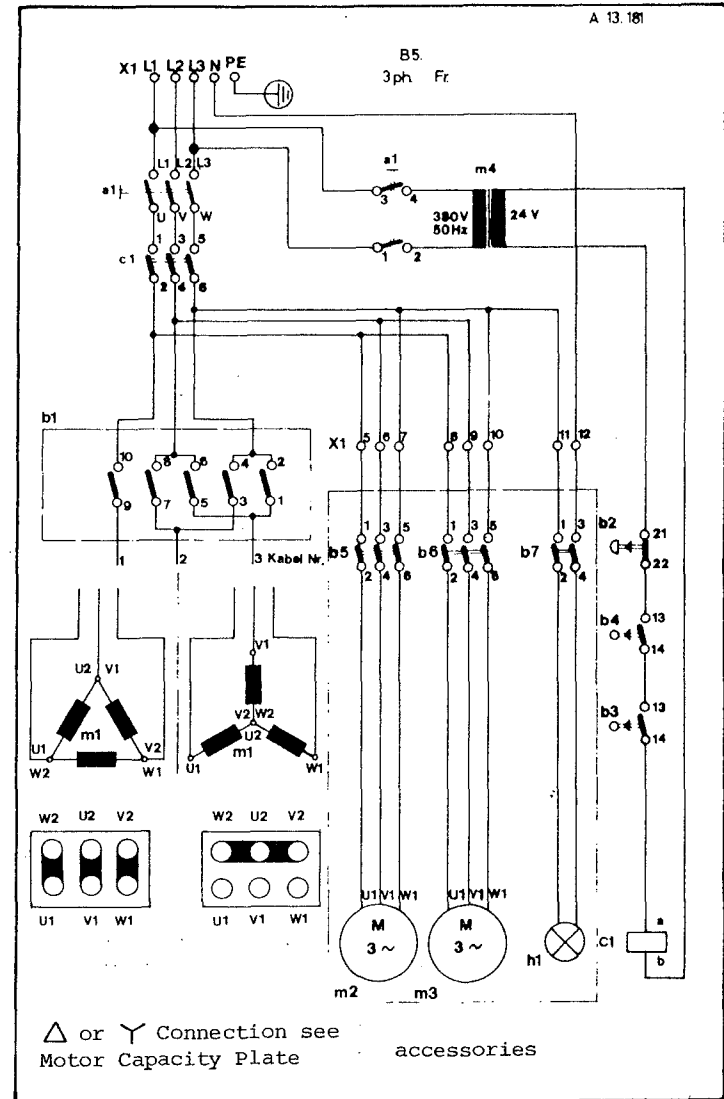


Special Safety Electric Version

Wiring diagram – single-phase



Wiring diagram – three-phase



III) Electrical Equipment Special Safety
Electric Version COMPACT 10

- a1 Main and emergency-off switch with low-volt release (c1 - main relay)
- b1 Main motor switch
- b2 Mushroom off switch
- b3 Micro switch belt cover
- b4 Micro switch chuck guard
- k1 Condenser main motor (only single phase)
- x1 Clamping strip
- m1 Main motor
- b5 Motor switch vertical unit
- b6 Motor switch coolant pump
- b7 Switch machine lamp
- h1 Machine lamp
- k2 Condenser vertical motor
- k3 Condenser coolant pump
- m2 Motor vertical unit
- m3 Motor coolant pump
- m4 Transformer

} Accessories

SINGLE-PHASE CONNECTION

X1 Clamping strip

Main motor

- L1(1) Phase R
- N(2) Neutral wire
- PE Grounding wire S1
(connected to grounding strip)

Vertical unit

- 3 Phase R (wire no. 1)
- 4 Phase S (wire no. 2)
- 5 Phase T (wire no. 3)
- 6 Condenser vertical unit
- 7 Condenser vertical unit

Coolant pump

- 8 Phase R
- 9 Neutral wire
- 10

Machine lamp

- 11 Phase R
- 12 Neutral wire N

Note: the grounding wires are connected to the grounding strip.

THREE-PHASE CONNECTION

X1 Clamping strip

Main motor

- L1(1) Phase R
- L2(2) Phase S
- L3(3) Phase T
- N(4) Neutral wire N
- PE Grounding wire S1
(connected to grounding strip)

Vertical unit

- 5 Phase R (wire no. 1)
- 6 Phase S (wire no. 2)
- 7 Phase T (wire no. 3)

Coolant pump

- 8 Phase R
- 9 Phase S
- 10 Phase T

Machine lamp

- 11 Phase R
- 12 Neutral wire N

Note: the grounding wires are connected to the grounding strip.

Switching Scheme COMPACT 10



Main switch

a1	R U	S V	T W	13 14
0	—	—	—	—
1	x	x	x	x



Main switch (only valid for A13180 + A13181)

a1	L1 U	L2 V	L3 W	1 2	3 4	5 6
0	—	—	—	—	—	—
1	x	x	x	x	x	x

Motor switch single phase

b1	1 2	3 4	5 6	7 8	9 10	11 12
	x	x	x	—	—	x
0	—	—	—	—	—	—
	x	x	—	x	x	—

Motor switch three phase

b1	1 2	3 4	5 6	7 8	9 10
	x	—	—	x	x
0	—	—	—	—	—
	—	x	x	—	x