

Electronic Stop

QD55x / QE55x

Series: digital K2

CE

Instruction Manual

English

Part 1

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The **CE** symbol confirms that the respective drive system meets the requirements for partial machines of the following EU directives:

- **EMV Directive 89/336/EEG**
- **Low Voltage Directive 73/23/EEG**

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Technical updatings reserved!

1. General Safety Information

This 'Elektronik-Stop digital K2' Sewing Drive System (hereinafter called digital K2) has been constructed and tested in compliance with the relevant regulations and safety standards and has left our factory in proper safety condition.

In order to maintain this condition and to ensure non-hazardous operation, the user is obliged to observe the information and warning notes contained in this Operating Instructions Manual.

Our digital K2 is not a ready-to-use machine, but is designed for installation into machines of the sewing-thread processing industry operating in clean and dry localities. It is not allowed to operate the digital K2 in any machine unless the machine destined for receiving installation of this motor is specifically identified as being in compliance with the regulations of the EC Rule on machines.

Any application or use beyond the conditions stipulated above, such as outdoors, in moist or explosion-hazardous environment, is not considered to be in compliance with specifications. Application in compliance with regulations and standards also includes close observation of the operating, maintenance and repair conditions stipulated by the manufacturer.

Our digital K2 can function safely and reliably only when used in compliance with this Operating Instructions Manual and in compliance with the use it is intended for.

Read this Operating Instructions Manual thoroughly before unpacking and commissioning the digital K2. Please make yourself acquainted with all safety, installation, operating and maintenance instructions before starting operation of the digital K2, its accessories and attachments. Persons who are unfamiliar with the contents of this Operating Instructions Manual are not allowed to use the digital K2 described below!

Any and all activities on and by means of the digital K2 must be carried out exclusively under close observation of the general and specific safety instructions given in the ensuing sections of this Operating Instructions Manual!

All persons involved must be made thoroughly familiar with these safety instructions, requiring them to observe these closely. Non-observation of these safety instructions can cause injury to persons, damage to objects or malfunction of or damage to the drive system itself.

Any and all accident prevention regulations as well as the rules on work in compliance with proper practices and safety standards valid in the user country involved must be fully observed. This drive system is subject to installation and commissioning by properly trained personnel !

Installation and commissioning of the digital K2 must be made with due care by qualified technicians so as to minimize the effects of any disturbing influences which are likely to constitute health hazards to personnel or any other perilous condition.

Doing any work on any parts or elements of the equipment being under live voltage is not permitted! Exceptions are subject to EN 50110.

Before removing any cover parts or installing any attachments or accessories - such as synchronizer, speed control unit, light barrier control etc. - switch the machine off, shut off physical connection with mains voltage, and wait for the machine to come to complete stop.

In order to reduce any hazard of burns, fire, electrical shock, or injury, it is basically not permitted to make any structural modifications or other changes on the digital K2. Any exceptions from this rule are possible only subject to prior approval by the manufacturer. Any approved structural modifications or changes must be made with proper care by qualified personnel and in compliance with the manufacturer's instructions.

It is not allowed to operate the equipment with any cover or protection elements removed (such as belt guard with protected V-belt entry opening and belt retainer)!

Before leaving the workplace, turn the ON/OFF switch into its OFF position. In case of prolonged pauses of operation, remove the mains plug from the wall outlet so as to safeguard the drive system against being inadvertently switched on again.

Any equipment or auxiliary facilities additionally connected to the control system of the digital K2 are only allowed to be operated on low voltage generated by a safety transformer!

Never use the drive system with its ventilation louvers clogged. Make sure that ventilation louvers are unobstructed by fibres, lint, dust etc.

Do not introduce or drop any objects, such as needles, into the ventilation louvers.

Keep your hands out of the area of moving parts, such as the V-belt and its entry opening !

Do not operate the digital K2 when using aerosols (sprays) or oxygen !

This Operating Instructions Manual is an integral part of the digital K2 and must be passed on with it in case of change of ownership.

The instructions given in the sections below are destined for your own safety as well as for that of other persons.



Warnings given in various section of this Operating Instructions Manual for the purpose of preventing specific hazards of injury to persons or damage to the equipment are identified by the symbol shown at left.



This symbol is a warning given on the digital K2, indicating dangerous voltage.

2. Technical Specifications

Rated Values

	QD552	QD554	QE552	QE554	QE552	QE554
Voltage [V]	3 x 230/400		1 x 230		1 x 230	
Frequency [cps]	50/60	50/60	50	50	60	60
Current [amps]	2,76/1,6	2,95/1,7	4,4	3,8	4,7	4,1
Power output [Watts]	550		550		550	
Speed [rpm]	2850/ 3400	1430/ 1700	2850	1430	3400	1700
Torque [Nm]	1,84/ 1,54	3,68/ 3,08	1,84	3,68	1,54	3,08
Operating mode	S6 (33% duty cycle at $t_s = 3s$)					
Protection type	IP 40					
Insulation class	E					

Limit Values

	QD552/554	QE552/554
Range of voltage [V]	340 - 440	190 - 240
Power output (short-time) [Watts]	1500	750
Torque (acceleration) [Nm]	6,5	6,0

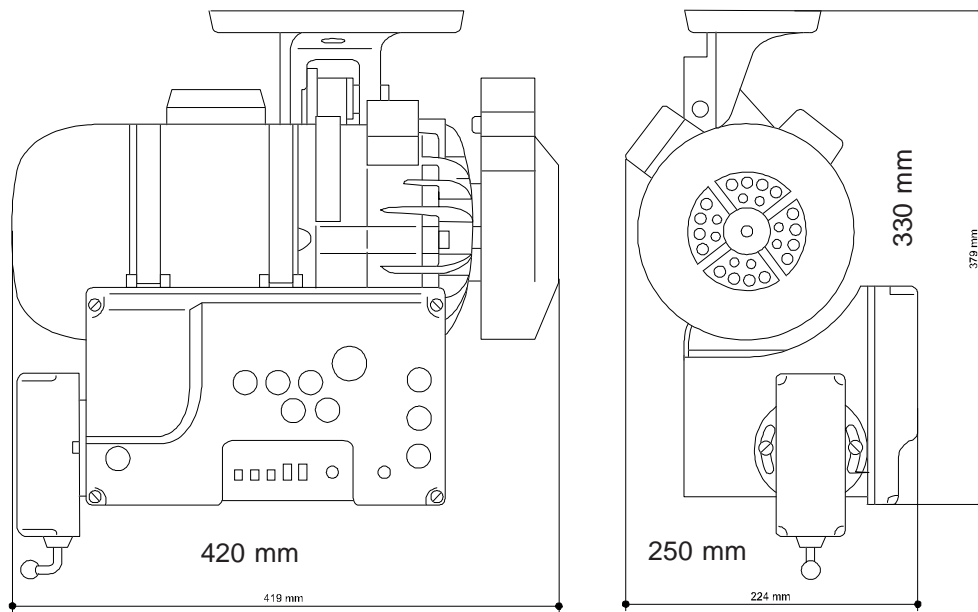
Conditions of Use

Ambient temperature [°C]	+5 through +40
Ambient temperature [°C] (24 hour average)	<35
Humidity (relative)	85% at 30°C

Driving Voltage of the Outputs

Idling voltage [V]	36
Voltage under load [V]	25 at $I = 4$ amps
Power [Watts]	100 (200 short-time)
Load current [amps]	4
Maximum load current [amps]	10 short-time

Dimensions :



Weights :	Total weight	27.850 kg
	Motor (without belt pulley)	20.400 kg
	Base with screws	2.220 kg
	Control system	4.000 kg
	Speed control unit	0.460 kg
	Synchronizer	0.240 kg
	Belt pulley (dia.58-120 mm)	0.170 kg - 0.320 kg
	Belt guard	0.270 kg

3. Range of Application

The digital K2 is not a ready-to use machine, but is intended for installation into other machines, such as sewing units and sewing equipment used by the sewing thread processing industry.

The digital K2 is destined for use in clean and dry localities.

Any application or use beyond the conditions stipulated above, such as outdoors, in moist or explosion-hazardous environment, is not considered to be in compliance with specifications.

Application in compliance with regulations and standards also includes close observation of the operating, maintenance and repair conditions stipulated by the manufacturer.

4. Scope of Supply

- 1 x asynchronous motor with flange-mounted clutch and brake unit
- 1 x each control system
- 1 x each speed control unit (command unit)
- 1 x each synchronizer (position control unit)
- 1 operator panel B2 (optional)
- 1 operator panel OC-TOP (optional)
- 1 x each belt pulley
- 1 x each motor suspension base
- 1 x each belt guard
- 1 x each pitman rod
- 1 x each Operating Instructions Manual

5. Transport and Storage

The digital K2 has left our factory after thorough final inspection.

Please check the drive system for any transport damages.

If necessary, file claims with the carrier.

Complaints for missing parts will be accepted within 14 days from the date of purchase.

The digital K2 and its accessories are shipped in a carton with polyurethane insert;

outside dimensions: L = 555 mm,
 W = 380 mm
 H = 395 mm

This packing material protects the digital K2 against outside influences during transport and storage.

The digital K2 is designed to withstand temperatures during transport and storage of between -25°C and +55°C and briefly, but not longer than 24 hours, up to +70°C.

Storage in the packing material must be in a dry environment.

Handle the carton and its contents with care!

6. Mounting Instructions

For ease of packing, the digital K2 is not mounted ready for use when delivered to the customer.

Before starting installation, please remove all parts from the packing material.

The carton holds the digital K2, its accessories and this Operating Instructions Manual.

Check the contents of the packing carton for completeness.

If you have any questions about installation that are not clarified by the Operating Instructions Manual, please contact us or one of our after-sales service agencies.

Mount the digital K2 in compliance with the relevant instructions and illustrations.

6.1 Guidelines for Motor Mounting



When mounting the motor, make sure that the motor will not be dropped; for instance remove the sewing machine head from the table top; place the table upside down; then mount the motor upright to the table top.

- Adjust the motor so as to make the belt pulleys of motor and machine align perfectly (Fig. 6.1).
- Make sure to use the correct belt length and tension.

For belt tension note the following :

Belt tension is correct when the two opposing strands of the belt can be pulled together by approx. 2 cm between thumb and forefinger (Fig. 6.2).

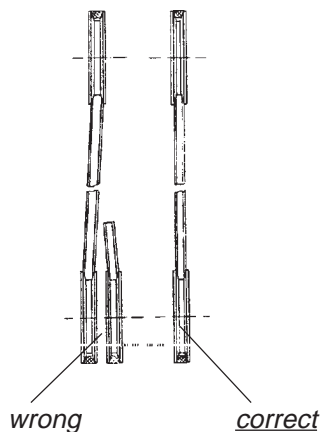


Fig. 6.1

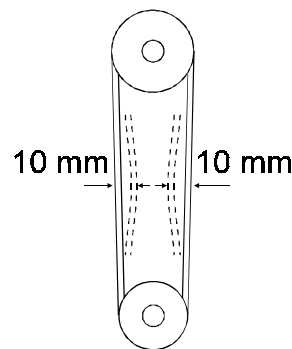


Fig. 6.2

6.2 Mounting the Motor to the Machine Table

The motor is suspended from the base by means of a articulation.

Mount the base to the table top from beneath.

Attachment of the base to the sewing machine table depends on the material used for the table top :

- 1. Laminated wooden panel
Attach the base by means of hexagonal head screws M8 x 35 (DIN 933).
For this purpose, first screw insert bushes M8 x 14 (DIN 39) into the table top.
- 2. Wooden panel in general
Attach the base by means of carriage bolts M8. For this purpose, drill 3 throughholes 9 mm dia. through the table top.

See the position of the drill hole from Fig.6.3

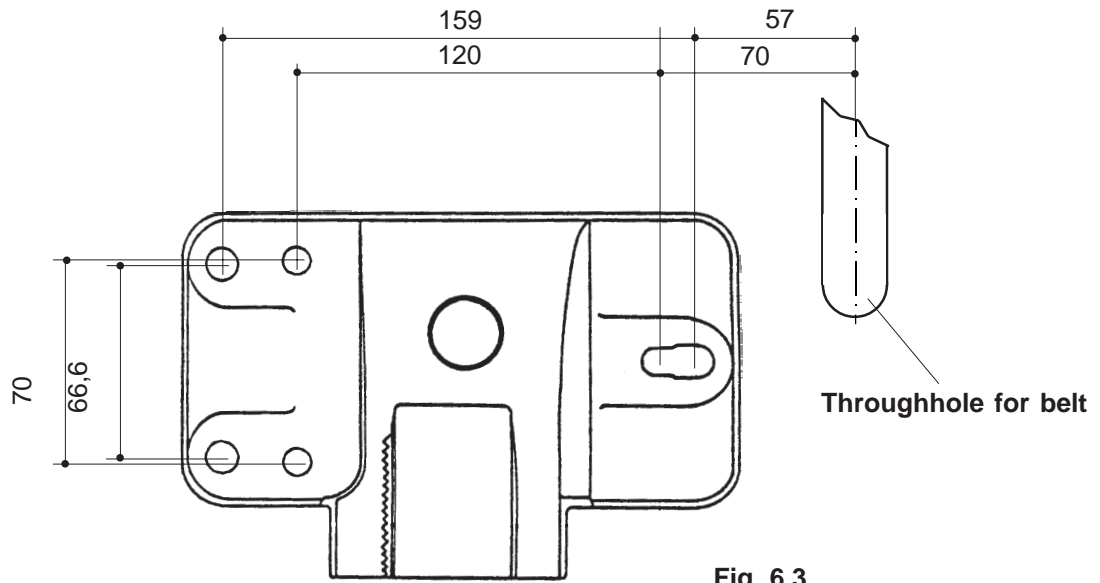


Fig. 6.3

6.3 Choice of the Motor Belt Pulley

Speed adjustment on the digital K2 is achieved by means of an electromagnetically controlled friction clutch. In order to keep wear on this clutch to a minimum, make sure that the motor will not run with the clutch slipping at operating speed, i.e. the clutch must be completely engaged.

To ensure this, the motor shaft must be equipped with a belt pulley having an adequately adapted diameter.

The size (diameter) of the belt pulley is determined by the following equation:

$$DS_{Mot} = \frac{n_{Masch}}{n_{Mot}} \times DS_{Masch}$$

wherein

- DS_{Mot} = diameter of motor pulley [mm]
- DS_{Masch} = diameter of machine pulley [mm]
- n_{Mot} = rated motor speed [rpm]
- n_{Masch} = machine operating speed [rpm]

The diameter DS_{Mot} can be easily obtained from the graphs see below (Fig. 6.4, Fig. 6.5, Fig. 6.6, Fig. 6.7).

Explanation of the graph:

On the horizontal x-axis the machine speed (n_{Masch} [U/min]) is plotted. The diameter of the motor pulley ($\varnothing S_{Mot}$ [mm]) can be plotted on the perpendicular y-axis. A different handwheel disk diameter ($\varnothing S_{Masch}$ [mm]) is represented by each curve. The diameter of these handwheels can be found on the right-hand axis.

All curves on a plot are for a constant motor speed (n_{Mot} [U/min]).

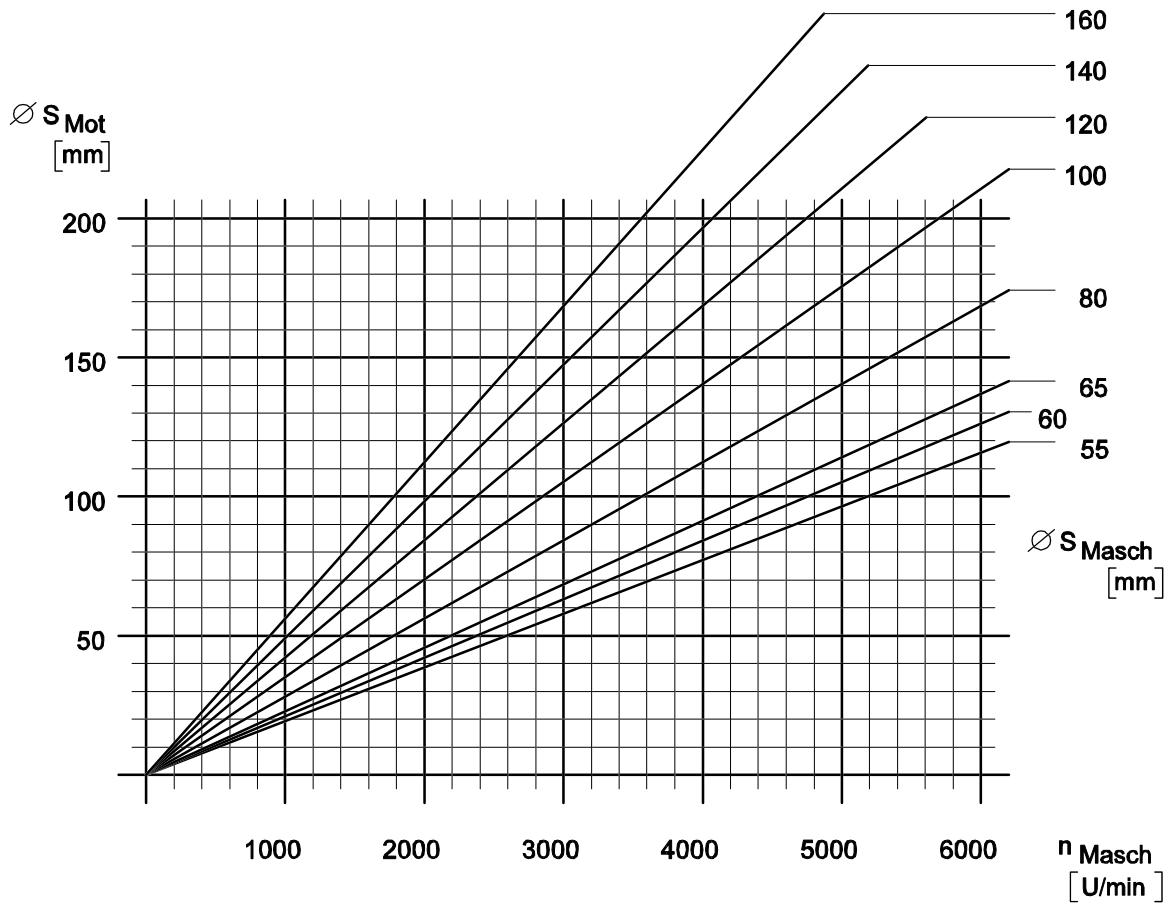


Fig. 6.4 Diagram for QD 552 / QE 552 at 50 Hz ($n_{Mot} = 2850$ rpm)

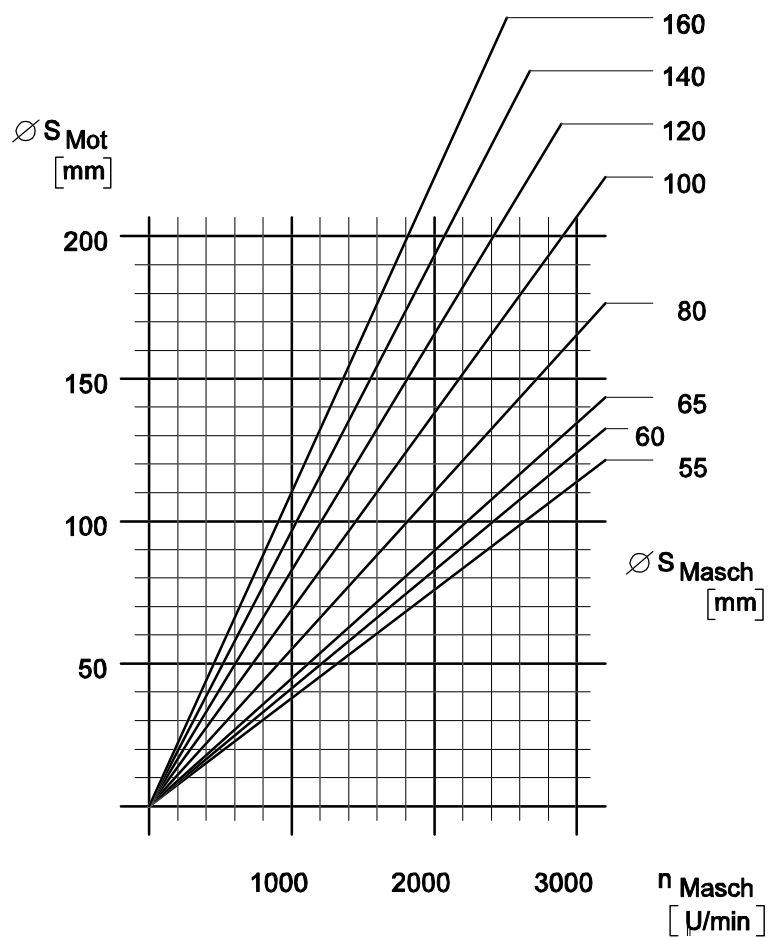


Fig. 6.5 Diagram for QD 554 / QE 554 at 50 Hz ($n_{Mot} = 1450$ rpm)

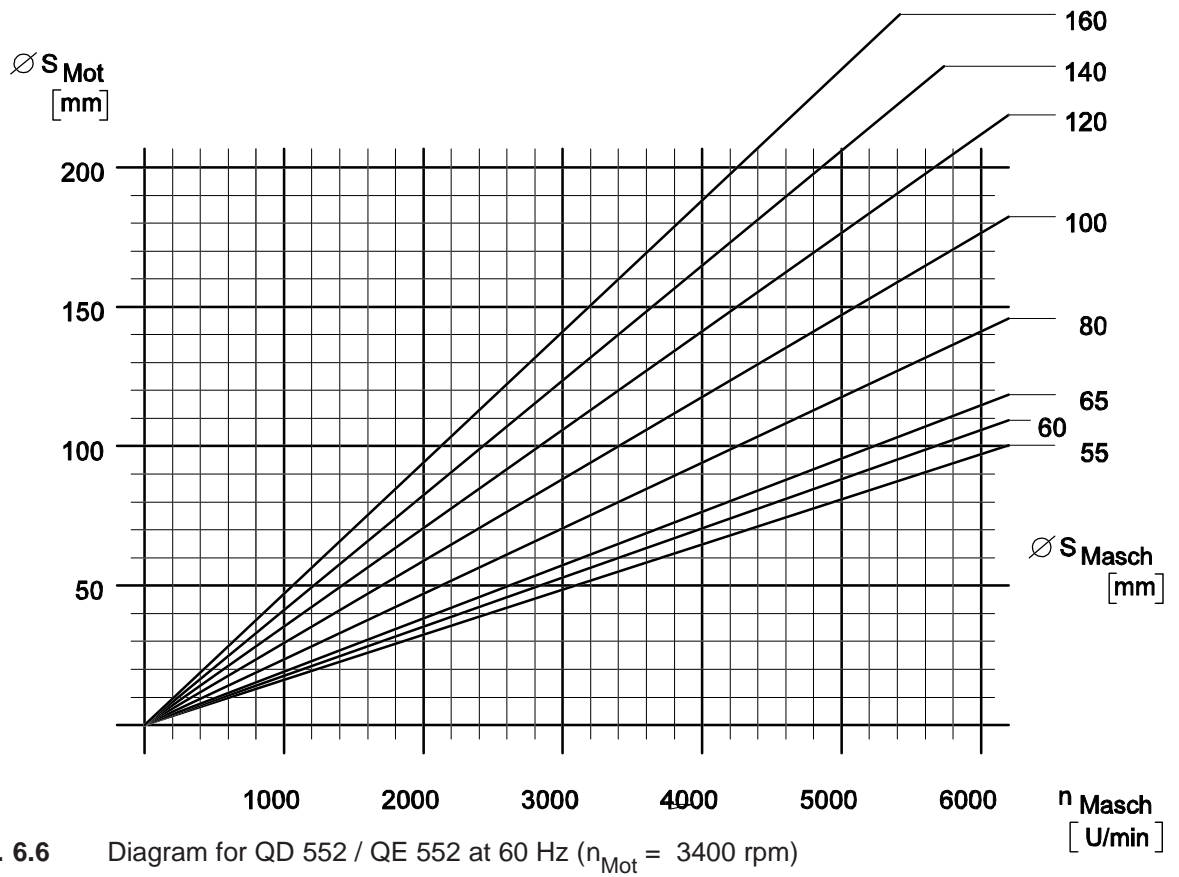


Fig. 6.6 Diagram for QD 552 / QE 552 at 60 Hz ($n_{Mot} = 3400$ rpm)

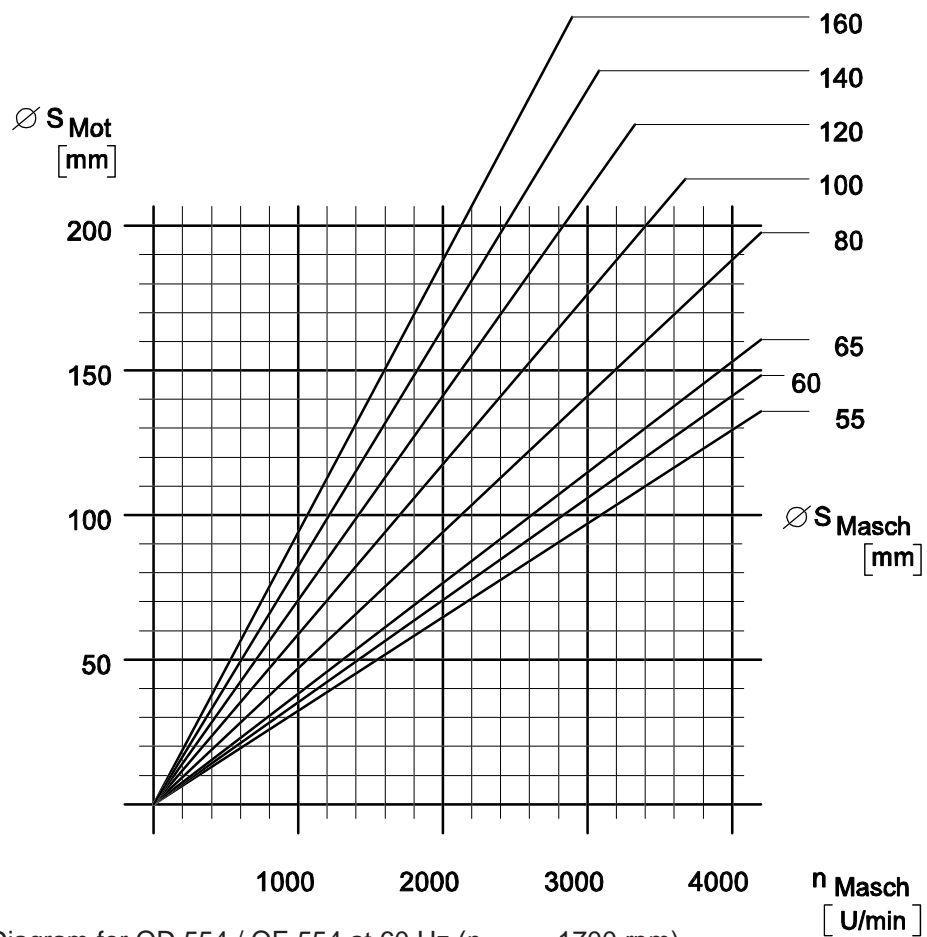


Fig. 6.7 Diagram for QD 554 / QE 554 at 60 Hz ($n_{Mot} = 1700$ rpm)

6.4 Mounting of Belt Pulley and Belt Guard

- Attach bottom part (1) of the belt guard loosely to the A end bell of the motor by means of two screws (2).
- Loosen belt retainer (8) and the two belt guides (16) and move outward.
- Install key (3) into the groove provided on the motor shaft (4).
- Slide belt pulley (5) onto the motor shaft (4) so as to make key (3) engage the groove in the belt pulley bore.
- Secure belt pulley (5) axially on the motor shaft by means of nut (6).
- Secure nut (6) by tightening securing screw (7).
- Place a belt with appropriate length, and tighten screw (9) on motor suspension (11).
- Align belt guard bottom part (1) according to the belt and secure by tightening screws (2).
- Slide belt retainer (8) towards the belt pulley (max. distance 3 mm) and tighten.

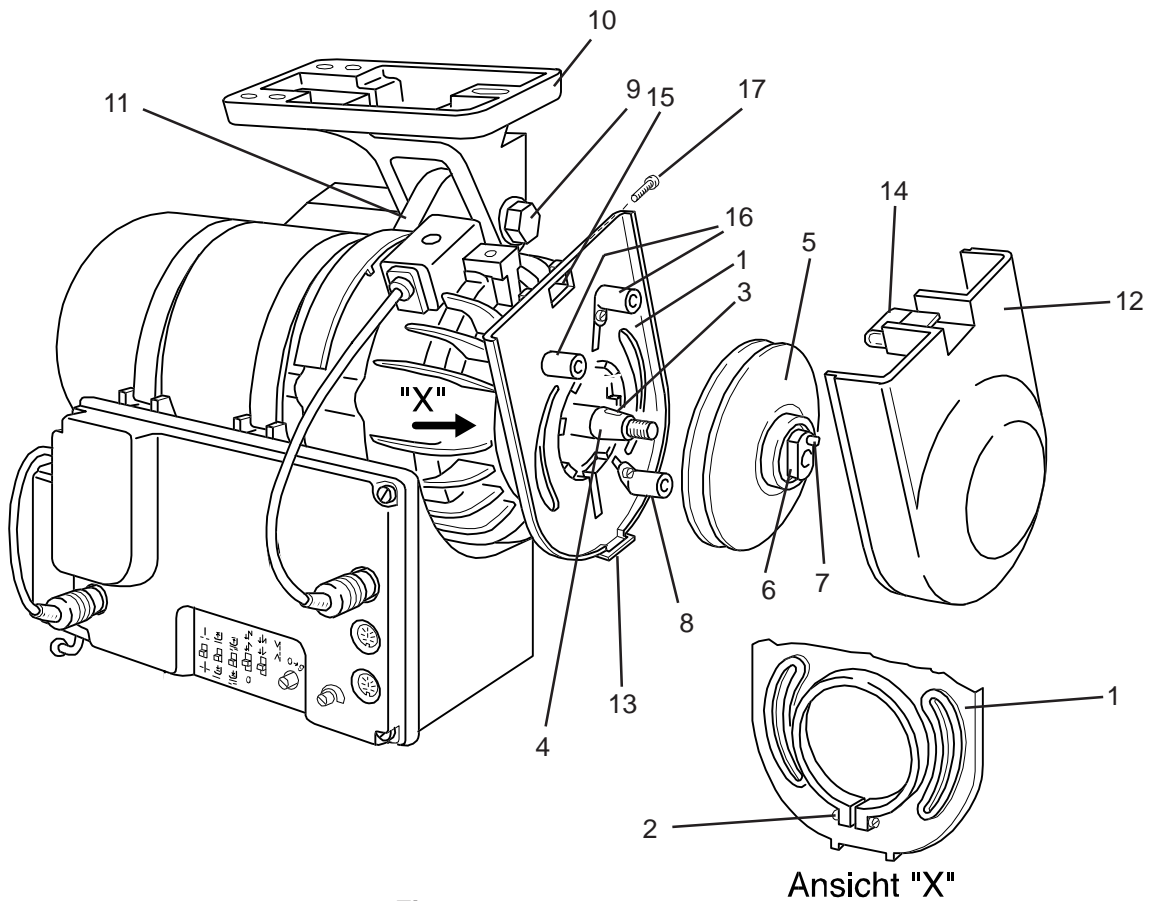


Fig. 6.8

- Move belt guides (16) on the belt entrance side inward far enough as to obtain a maximum distance of 4 mm from guide cylinder to belt pulley and from guide cylinder to belt, respectively (see Fig. 6.9)
Tighten the belt guides in proper position.

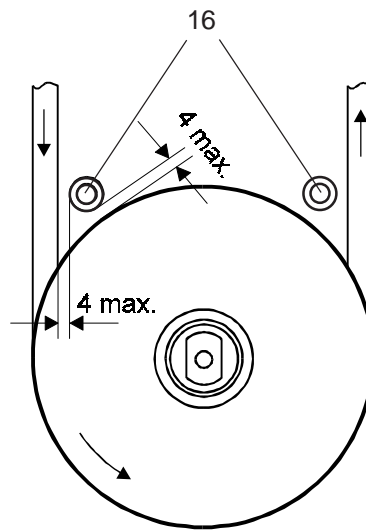


Fig. 6.9

- Insert belt guard upper part (12) into eye (13) on bottom part (1) and press in as to make clip (14) on the upper part slip through slot (15) on the bottom part.
- Secure upper part (12) on the bottom part by means of screw (17).

6.5 Electrical Connection (to Mains Power)



All work on the electrical equipment (connection, maintenance, repair) is permitted to be performed only by or under the supervision of a properly qualified technician.

Before connecting the power supply line, make sure that your mains power voltage is within the rated voltage range specified on the nameplate.

Connection to mains power is permitted only by means of a multi-contact plug with protection earth contact. Fixed connection is not permitted.

The digital K2 designed for connection to the following types of mains power systems:

- **TN:** System with a directly earthed point and with a protection earth conductor (PE) connected to this point)
- **TT:** System with a directly earthed point, the protection earth conductor (PE) not being connected to this point
- **IT:** System not directly earthed

Connection of the QD55x

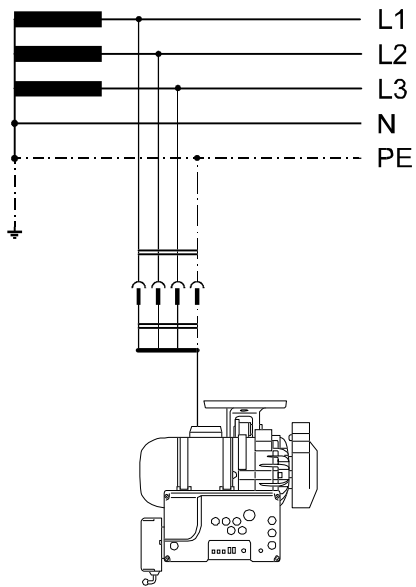
The QD55x digital K2 is designed for connection to an earth threephase AC mains power system with a voltage of

230/400V ~ 50/60 cycles

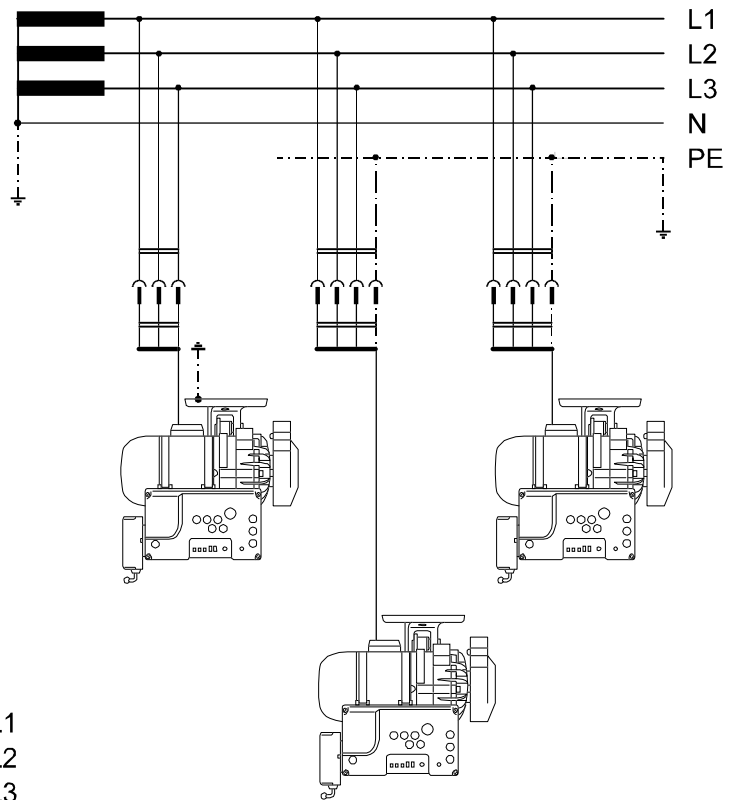
The following potentials must be connected:

Phase (L1 and L2 and L3)
 Neutral conductor (N) can be connected to a terminal without function
 Protection earth conductor (PE)

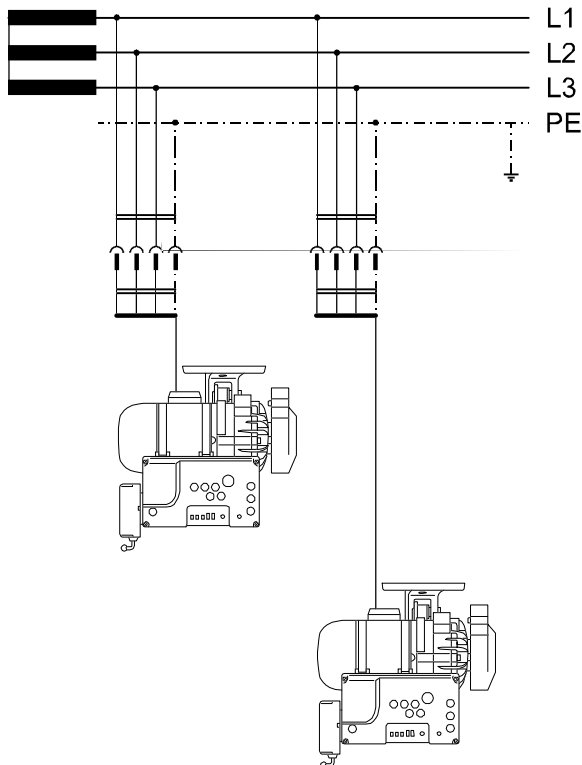
TN system



TT system

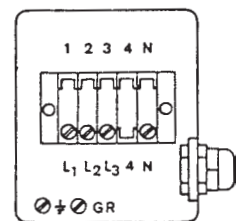


IT system



Connections in the terminal box of the motor

Anschlüsse Connections Branchement Collegamento		Y	Δ
Motorlitze	U1	1	1
Wire	V1	2	2
Fila	W1	3	3
Fila	U2	4	1
	V2	4	2
	U2	4	3
Steuerkasten Control box Caja de mando Cassetta di comando		3-4	1-3



Connection of the QE55x

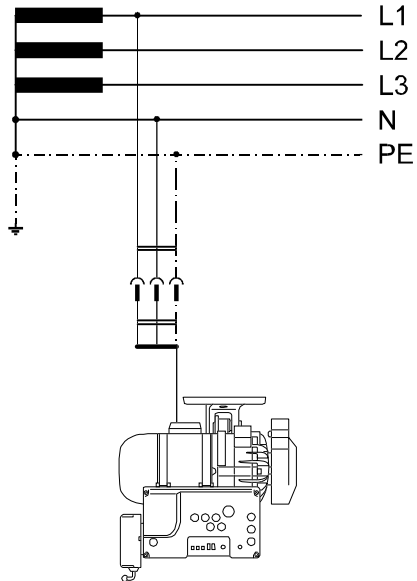
The QE55x digital K2 is designed for connection to an earth single phase AC mains power system with a voltage of

230 V ~ 50/60 cycles

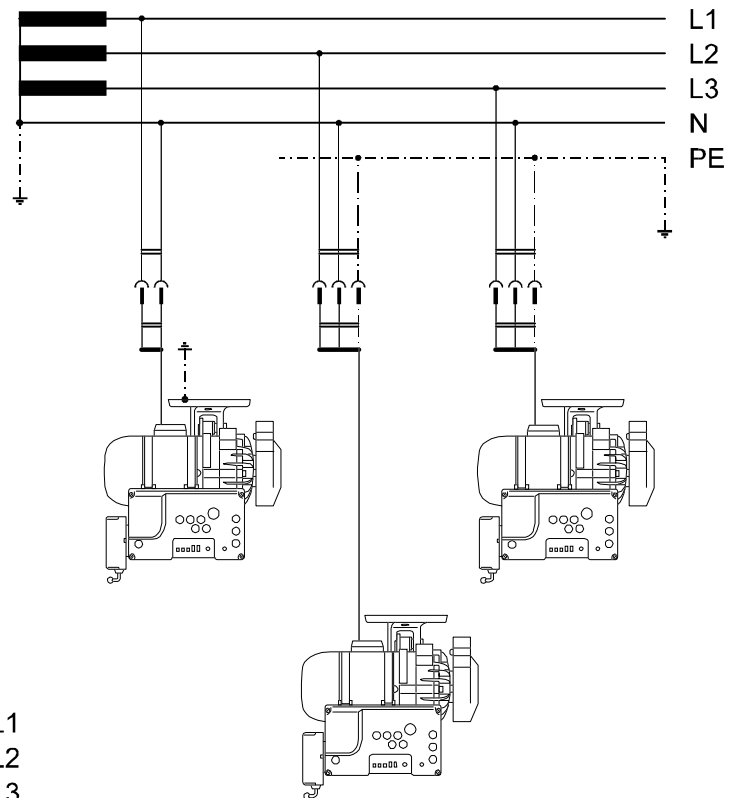
The following potentials must be connected:

Phase	(L1 or L2 or L3)
Neutral conductor	(N)
Protection earth conductor	(PE)

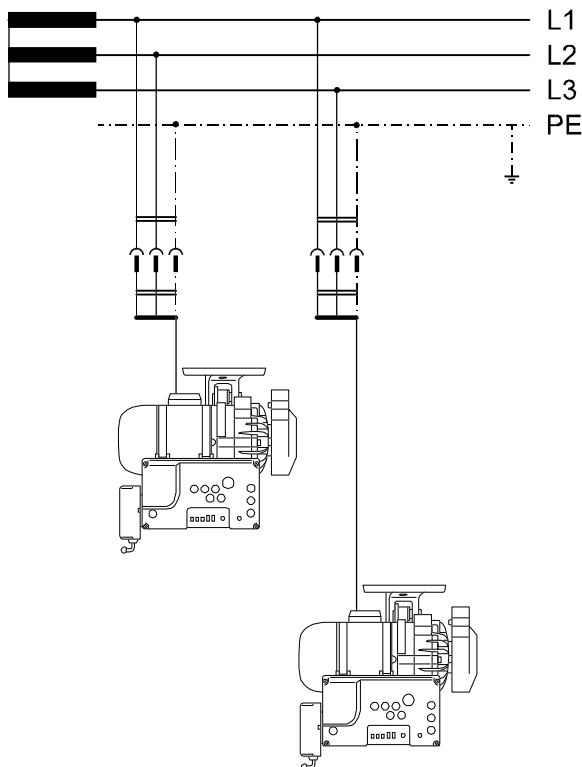
TN system



TT system

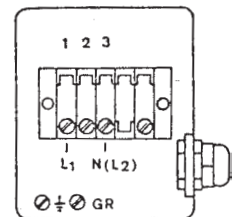


IT system



Connections in the terminal box of the motor

Anschlüsse Connections Branchement Collegamento		↻	↺
Motorlitze	U1	1	1
Wire	Z1	2	2
Fila	U2	3	3
Filo	Z2	3	1
Kondensator Capacitor Condensateur Condensatore		1-2	2-3
Steuerkasten Control box Caja de mando Cassetta di comando		1-3	1-3



The following applies to TT and IT systems:

All elements protected by a common protective device must be connected to the same earthing via protection earth conductors.

All elements apt to be touched simultaneously must be connected to a common earthing.

The following applies additionally to IT systems:

No active conductor within the installation is permitted to be earthed directly. All elements must be connected individually, in groups, or in total with a protection earthing conductor.

The digital K2 is a product of protection class I, that means that for protection against indirect handling, a connection is necessary for a protective earth conductor.



The digital K2 is permitted to operate only in a properly functional protection earth system in compliance with all local rules and regulations in order to avoid danger to persons by electric shock or fire hazards in case of malfunction. It is not permitted to disable the protection system by using extension cables not equipped with a protection earth conductor.



Caution: Any interruption of the protection earth conductor within the digital K2 or outside, or by disconnecting the protection earth connection, can result in making the equipment hazardous.
Any intentional interruption is inadmissible.

Fault Current Protection Devices

If any digital K2 is to be monitored via fault current protection devices, then the latter must be shock puls proof, short pulse delayed as well as suited for alternating and pulsating constant fault currents.

For connections, use line types not lighter than plastic- insulated sheathed flexible cables H05 VV. The minimum conductor cross section must be 1 mm², with the line length not in excess of 5 m. The voltage drop in the protection earth conductor is not permitted to exceed 3.3 V at a measuring current of 10 amps.

Any lines installed must be properly protected against anticipated loads and must be properly fastened.

Place and attach lines so as to maintain a minimum distance of 25 mm relative to any moving parts.

Place lines, mains power leads and low voltage circuits at a proper distance from each other to achieve adequate separation.

For replacement make sure to use exclusively fuses of the type and current rating specified.

Any bridging-over of fuses is inadmissible and will create electrical or fire hazards.

If there is reason to presume that operation without hazards will not be possible, discontinue operation of the drive system and safeguard the equipment against inadvertent use.

Reasons to presume that operation without hazards will not be possible are as follows:

- if the drive system presents visible damage, for instance mains power connection cable,
- if the drive system fails to function,
- after lengthy storage at unfavourable conditions.

Insert and lock carefully the connectors on the control system after having checked the pin and socket configuration and the plug-in direction, to avoid malfunction.

The brake action will not be initiated when mains power supply is switched off or power failure occurs during operation of the digital K2.



When leaving the workplace or when doing maintenance work, separate the machine from mains power by pulling out the plug. For this, do not pull at the cable, but grip the plug and pull it out.

Before separating the digital K2 from mains power, bring all control elements into „OFF“ or „0“ position.

6.6 Electro-Magnetic Compatibility (EMC)

The digital K2 is designed for installation/attachment to EMC sewing units and equipment, i.e. it complies with the relevant EMC regulations (CDV IEC 204-3-1 44 sec 169) for a cable length of 500 mm at each input or output connector. In accordance with experience, this is adequate for sewing units.

More complicated sewing equipment may require additional action due to longer cables, unfavourable cable placement, neighbouring strong interference fields etc.

The following action can be appropriate for reducing or eliminating interference:

- The use of appropriate filters, delay units, line material or line placement.
- Lines belonging to different circuits (such as mains power, low voltage) being placed at a proper distance from each other to minimize interference.
- Reference potential conductors for the circuits, or a common connection point: star-type wiring with one or more reference points earthed via insulated conductors having a large cross section.
- Electrically conductive parts of the sewing unit or equipment should be connected via potential compensation leads to the protection earth conductor on the digital K2 casing next to the cable grommet for the mains power connection cable. (Use leads suited for high frequencies: fine-gauge stranded leads with a cross section of at least 2.5 mm², or large-area copper bands.)
When connecting potential compensation leads, make sure to achieve good contact, i.e. use toothed washers for connections to painted parts.

Include the following parts in potential compensation:

- sewing machine head
- sewing machine stand
- treadle
- housings of solenoids or solenoid valves
- holding brackets for push-button switches
- stands for stackers, band feeders etc.

- Mass Connections
Lead mass connection lines from each equipment element to a common point.
Use large cross section braided leads between moving parts and casings while keeping mass connection as short as possible.

- Signal Transmission
Use electrostatic and magnetic screening, twisted conductors and appropriate line placement to ensure that transmission of interference voltages from control or mains power lines to signal lines is prevented.
(Right-angle line crossings are better than any lower angles; by all means avoid parallel placement.)

- Separation of Equipment Parts
Equipment parts that are susceptible to interference parts (pulse-processing and/or low-level subassemblies) should be mounted separately from and/or be screened against switching devices such as electromagnetic relays, thyristors etc.

- Although being largely insusceptible to interference, the digital K2 should not be operated in the immediate vicinity of HF welding devices or similar equipment to avoid malfunction.

- The digital K2 is capable of complying with EMC regulations only when the control box front is provided with its cover!

Whenever trouble should occur, please contact the manufacturer.

6.7 Mounting of the Synchronizer (Position Control Unit)

- Fig. 6.10 shows a front view of the synchronizer. Slip the synchronizer onto the accommodation stub on the handwheel and secure by means of 2 socket head hex screws (a).
- The accommodation bore of the synchronizer shaft (b) has a diameter of 22.2 mm (tolerance E7).
- The accommodation stub on the sewing machine handwheel must have appropriately close tolerance!
- Before slipping the synchronizer onto the handwheel, make sure to turn the two screws (a) back far enough so as to prevent them from projecting into accommodation bore (b)!
- The diameter of the accommodation stub on the handwheel must be:
22.2 mm (tolerance k8) for low-speed sewing machines
22.2 mm (tolerance p6) for high-speed sewing machines

Explanation:

Tolerance	k8	p6	E7
min. deviation [μm]	0	+22	+40
max. deviation [μm]	+33	+35	+61

- The synchronizer housing must be secured against rotation. For this purpose, mount a fixing device, for instance a threaded pin (6 mm dia.) on the sewing machine casing. This must project into the fixing slot (c) on the synchronizer housing and thus hold the synchronizer free of clearance by means of an elastic insert.

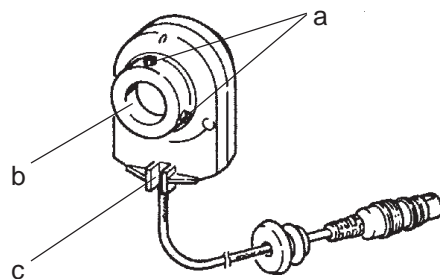


Fig. 6.10

6.8 Mounting of the Speed Control Unit

- Attach the speed control unit baseplate (6) to the lefthand side of control box (2) by means of two screws.
- Connect the push/pull bar of the speed control unit with the machine treadle by means of a pitman rod.
- The push/pull bar of the speed control unit and the pitman rod linking it with the treadle should form as straight a line as possible in order to ensure optimum transmission of force between the speed control unit and the treadle.
- The pitman rod and the treadle should form an angle as close to 90 degrees as possible.
- The speed control unit can be swivelled on the control box within a range of 40 degrees.
- Make sure that the treadle can move with ease !

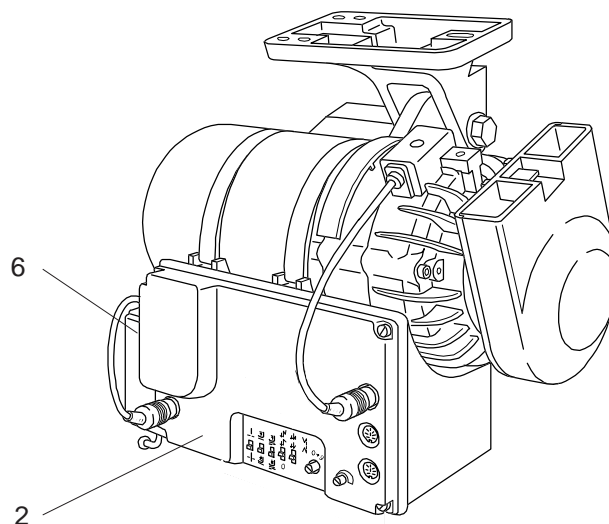


Fig. 6.11