MULTITHREAD
STOP MOTION
CENTRAL
CONTROL UNIT
15130

OPERATING MANUAL

ELTEX
OF SWEDEN

MANUAL FOR CENTRAL CONTROL UNIT 15130

Eltex multithread monitoring system

The Eltex multithread system is designed to monitor a number of simultaneously moving threads or wires.

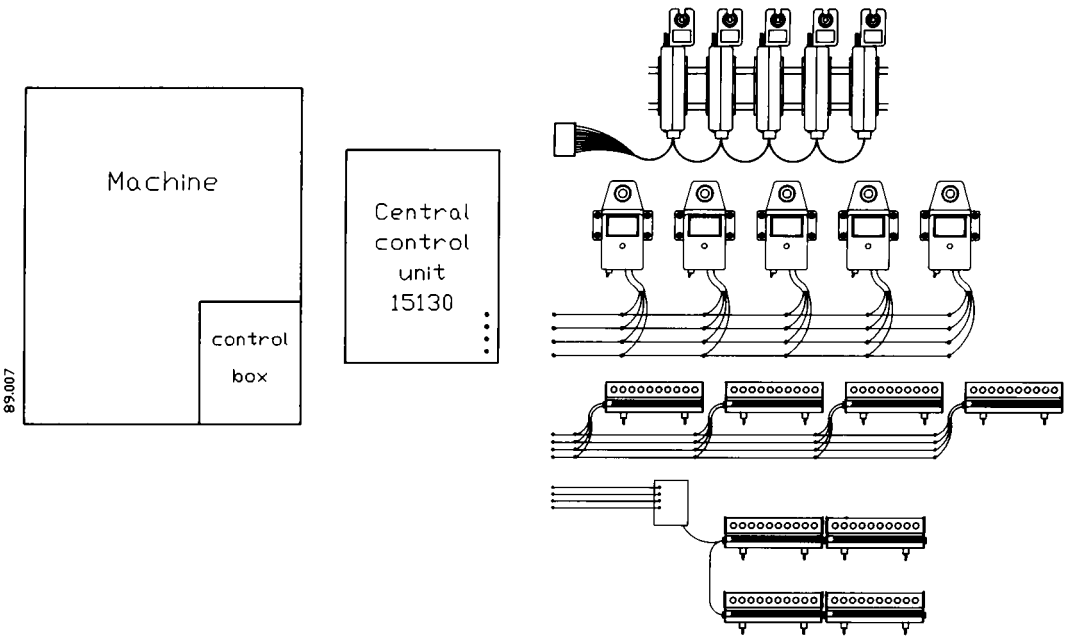
Function description

The **15130 central control unit** provides a supply voltage for the signal givers. It coordinates the signals from the signal givers and will give a stop signal to the machine, or a warning to the operator when a thread or wire is broken. Up to 100 pcs Eltex multithread signal givers can be connected in parallel to one central control unit.

The **signal givers** are made in many different shapes to suite different machines. The working principle is the same for all types: a piezoelectric element is transferring the thread or wire movement in the ceramic eyelet into an electric signal. This signal is amplified and evaluated within the signal giver. The output function is also the same for all types of signal givers.

Signal interchange

Machine		Central control unit		Signal givers
Information about when the machine starts or alternative information about the machine speed.	→		→	Power supply voltage. Gain voltage by which the amplification in the signal givers can be regulated.
A stop signal when a thread or wire is broken. Signal to the indication lamp as long as the machine is stopped because of a thread or wire break.	←		←	One of the conductors in the cable between the central control unit and the signal givers, the line, carries the information if a thread or wire is broken. The line is normally low. When a signal giver is detecting a fault, it will pull the line voltage high.



THE DIFFERENT WORKING MODES

The machine starts
The sensing of the yarn cannot normally start immediately after the machine is started, as the speed of the thread or wire is then too low. There are two ways to determine when to start the sensing.

a) **start delay.**
b) **speed dependent sensing.**

By **start delay** the running mode input will be connected to a contact on the machine that closes when the machine starts. This will activate the start delay, set by the potentiometer on the central control unit. When the start delay time is out, the yarn or wire speed should be high enough for the signal giver to detect. The central control unit is then resetting all the signal givers by connecting the line (connection no 41) to ground for a short while. It also deenergizes the indication relay.

By **speed dependent sensing** the central control unit will switch on the sensing as soon as the machine speed is above a preset threshold value. If the machine speed decreases under that value the sensing will be switched off again. The machine speed, at which the sensing should start, will be set by the potentiometer. Information about the machine speed will be given to the central control unit by means of a proximity switch and a flag fitted on a shaft of the machine.

The LED called "SENSE" will light when the unit is sensing.

When the machine is running
The central control unit will now sense the voltage on the line. The voltage will stay low as long as the threads are moving correctly.

One thread breaks

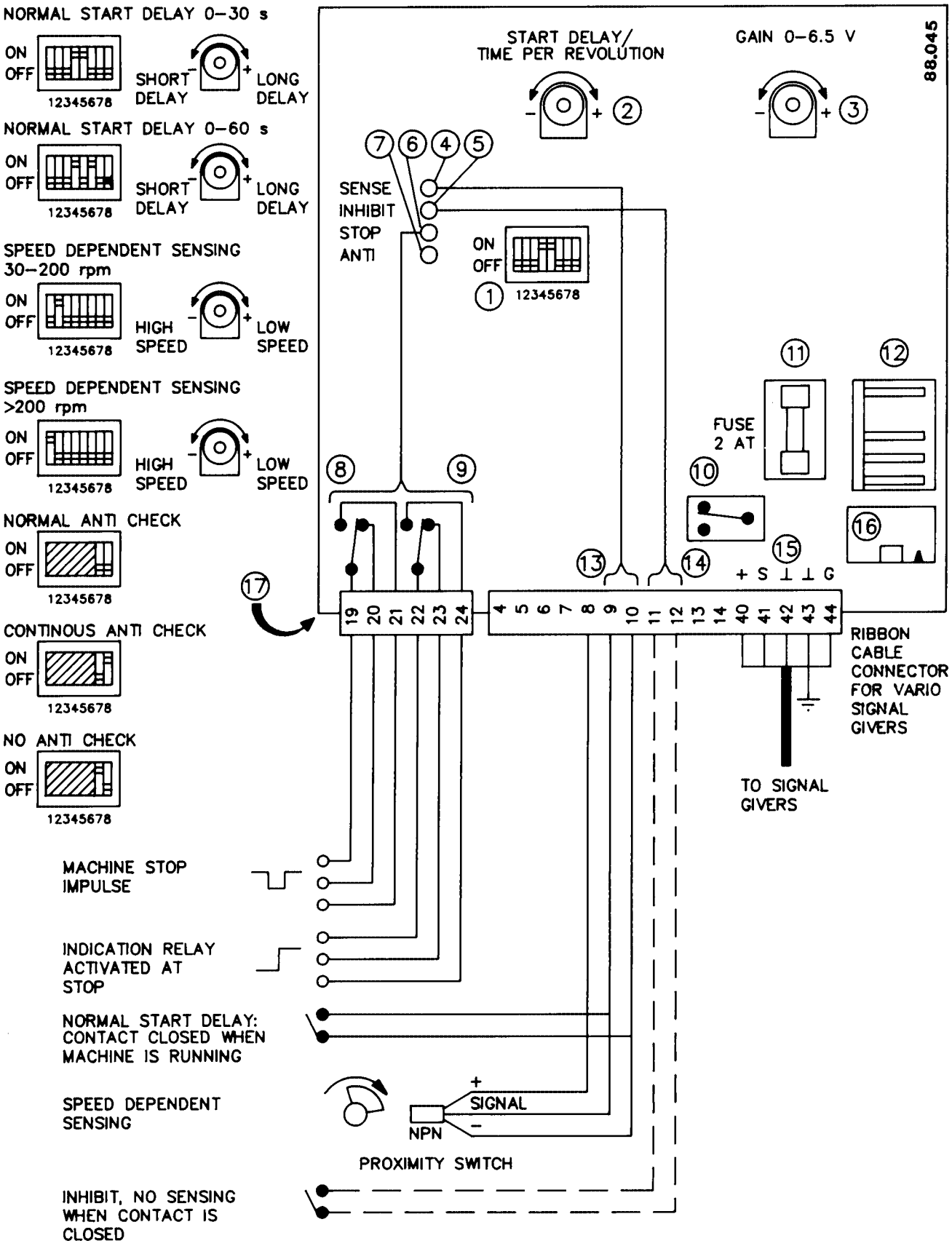
If any signal giver detects that its thread or wire is not moving, it will pull the line voltage high. The central control unit detects the stop and answers back by lifting the line to 12 V. As long as the line is held high from the central control unit, all signal givers will be blocked in their present state. This is done to prevent stop indication from all signal givers when the machine stops.

The stop relay drops for about one second to stop the machine, and the indication relay is energized to indicate the stop.
The stop will be indicated in three ways:
a) with a lamp connected to the indication relay.
b) with the red LED "STOP" on the central control unit.
c) with the red LED on the signal giver where the thread is broken.

ANTI-check
The central control unit also has an ANTI-check function, which checks if a thread is moving in any of the signal givers with the switch in "OFF" position. If a thread is moving, it will give a stop impulse. Normally the check is done once, approximately 10 seconds after each start of the sensing. It could also be set to be made continuously every 3 seconds, or it can be completely switched off. If the machine has been stopped because of an ANTI-check fault, the red LED called "ANTI" will light together with the "STOP" LED. Note: The ANTI-LED will not indicate at ANTI-faults when SMG signal givers are used, due to the scanning principle of these signal givers. However, it is easy to locate this kind of stop, as the stop is indicated at an eyelet which is switched off.

The machine stops for other reasons
The central control unit will lift the line voltage to 12 V DC as soon as the contact opens at **start delay** or as soon as the speed is below the threshold value at **speed dependent sensing.** That will prevent the signal givers to indicate stop, when the thread or wire movement goes down to zero.

CONNECTION, FUNCTIONS AND SETTING OF SWITCHES ON THE CENTRAL CONTROL UNIT



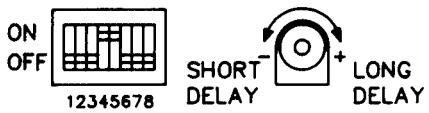
① DIP Switches

The DIP switches are normally set once when the stop motion is installed on the machine. The DIP switches are numbered 1 to 8. The switches with number 1 to 6 are used to select the way to activate the stop motion after the machine has started. Switches no. 7 and 8 are for the ANTI-function.

If the switches are set as the drawing shows, the function will be:

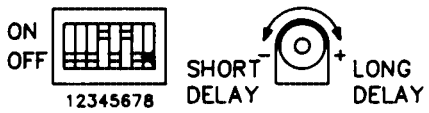
a) The stop motion will be activated as soon as the delay time has run out after a start up. The delay time can be adjusted between 0 - 30 s.

NORMAL START DELAY 0–30 s



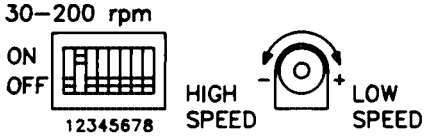
b) The stop motion will be activated as soon as the delay time has run out after a start up. The delay time can be adjusted between 0 - 60 s.

NORMAL START DELAY 0–60 s



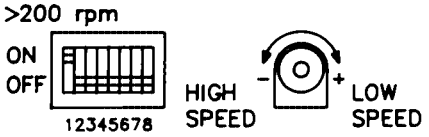
c) The stop motion will be activated whenever the speed of the machine is above a threshold value. This value can be adjusted between 30 - 200 rpm (+ and - refers to time/revolution)

SPEED DEPENDENT SENSING 30–200 rpm



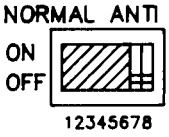
d) The stop motion will be activated whenever the speed of the machine is above a threshold value. This value can be adjusted from 200 rpm and up. (+ and - refers to time/revolution)

SPEED DEPENDENT SENSING >200 rpm



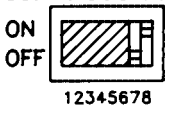
e) The ANTI-check will be carried out once after each start up. The check is done approximately 10 seconds after the sensing has started.

NORMAL ANTI CHECK



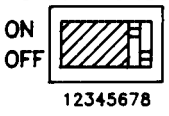
f) The ANTI-check will be carried out continuously every three seconds during sensing time.

CONTINOUS ANTI CHECK



g) No ANTI-check will be carried out at all.

NO ANTI CHECK



88.045

② Start delay/Time per revolution

Potentiometer to set the **delay time** from the machine start until the start of the sensing.
In case of **speed dependent sensing** this potentiometer will be used to set the threshold value at which the sensing will be switched on.

Adjustment of start delay time

Set the GAIN potentiometer in maximum position (fully clockwise).
The start delay time can be adjusted from 0 to 60 seconds. The fully clockwise position means the longest time. Set the potentiometer so that the speed of the threads has reached at least 25 - 30 m/minute when the green LED "SENSE" starts to light. The start delay time can also be set by first trying the medium setting. If the machine does not stop when the green LED lights goes on, then try to start the machine with a setting between medium and minimum setting and so on. If the machine stops try a setting between medium and maximum and so on.
Adjust the GAIN potentiometer according to point 3.

Adjustement of threshold value by speed dependent sensing.
Set the GAIN potentiometer in maximum position (fully clockwise).
Set the time per revolution potentiometer in high speed position (fully counter clockwise).
If it is possible, let the machine run at the speed where the sensing should start. Turn the potentiometer slowly clockwise until the "SENSE" diode turns on.
If the machine cannot run continuously at a low speed, try different settings until the "SENSE" diode turns on at the desired speed.
Adjust the GAIN potentiometer according to point 3.

(3) GAIN potentiometer
For adjustment of the sensitivity in the signal givers. The sensitivity in each signal giver can be adjusted by a 0 - 6.5 DC voltage from the central unit. 0 V means minimum sensitivity and 6.5 V maximum sensitivity.

Adjustment of signal amplification
The signal amplification "GAIN" can be set by the GAIN potentiometer. When adjusting, turn the potentiometer clockwise to the end position (maximum sensitivity). Let the machine run and turn the potentiometer slowly counter-clockwise until the thread stop motion stops the machine, even if no thread is broken. Then turn the potentiometer slightly clockwise. If false stops still occur, increase the setting further clockwise.

Please note that fully counter-clockwise position does not mean zero amplification. Therefore it is possible that some thread qualities will run with minimum sensitivity.

It is advisable to do this adjustment to ensure the safest monitoring of the threads. If the GAIN is set far too high, the stop might be delayed or the stop motion might not stop at all.

Also check that the stop motion does not stop when the machine is started at the time when the unit starts sensing. If it is important that the sensing starts at a low speed, it might be necessary to set the GAIN higher or to find out a compromise between sensing at low speed and the GAIN setting.

(4) Green LED "SENSE"
This LED will light when the machine is running and the unit is active sensing.

(5) Red LED "INHIBIT"
This LED will light if the sensing is inhibited. If it is desired not to sense the threads during a certain sequence when the machine is running, a closing contact can be connected to 11 and 12. When the contact is closed the sensing is inhibited.

(6) Red LED "STOP"
This LED will light when the central control unit has stopped the machine.

(7) Red LED "ANTI"
This LED will light when the central control unit has stopped because a thread has been moving in a signal giver with the switch in "OFF" position. The red LED "STOP" will also light in this case.
The LED "ANTI" will not indicate when SMG signal givers are used.

(8) Stop relay
This relay is normally energized when the machine is running. When a thread fault occurs it will be deenergized for about 1 second. Connections no 19, 20 and 21 on the left 6-pole edge connector.

⑨ Indication relay
This relay is normally deenergized when the machine is running. When a thread fault occurs it will be energized and stay in this position until the machine is restarted. Connections no 22, 23 and 24 on the left 6-pole edge connector.

⑩ Reset relay
This relay is for internal use. It resets the signal givers by grounding the line before the start of the sensing.

⑪ Power supply fuse
The power supply fuse (2 A slow) will protect the power supply if any connections are incorrect or if the central control unit is damaged. When it is blown the stop motion will not work at all and no LED will light.

⑫ Power supply connector
The 20 V DC voltage from the power supply underneath is connected to this terminal. The ground is connected to the upper connection and the positive voltage to the lowest connection.

⑬ Running mode input
a) If the DIP switch on the unit is set to **start delay**:
A contact on the machine, which closes when the machine starts and opens when the machine stops again, must be connected to the running mode input (9-10). This will give information to the central control unit when to start sensing the threads and when to stop sensing them.
b) If the DIP switch on the unit is set to **speed dependent sensing**:
A proximity switch with NPN output must be connected to the running mode input (8-9-10) The proximity switch must be fitted on the machine so that it gives a pulse for each revolution of the machine.

⑭ Inhibit input
If, for some reason, it is desirable not to sense the thread movement during a certain sequence when the machine is running, it is possible to inhibit the sensing by connecting a closing contact to number 11 and 12.

⑮ Input for signal givers
The signal givers are connected to these screw terminals. Connection no 40 is power supply, connection no 41 is line(S), and connection no 44 is gain (G). Connection no 42 and 43 are ground connections.

The standard colour on an Eltex cable is:

red	power supply (+)	(40)
grey	line (S)	(41)
black	ground	(42, 43)
blue	gain (G)	(44)

The edge connector numbered 4-44 on the central control unit is removable.

⑯ Ribbon cable connector
When signal givers with 10-pole ribbon cable connectors, like for example Vario, are used, the ribbon cable can be connected with a connector directly to this connection. Eltex has a special cable gland with no. 02375 to use when the ribbon cable is passing the wall into the central control unit box.
Note: SMG signal givers, with 9-pole D-sub connectors using a 9-pole ribbon cable, must be connected via partial indication units or according to special connection diagram.

⑰ Power supply
Input voltage 220, 290, 380, 440 or 550 V AC.

FITTING AND WIRING

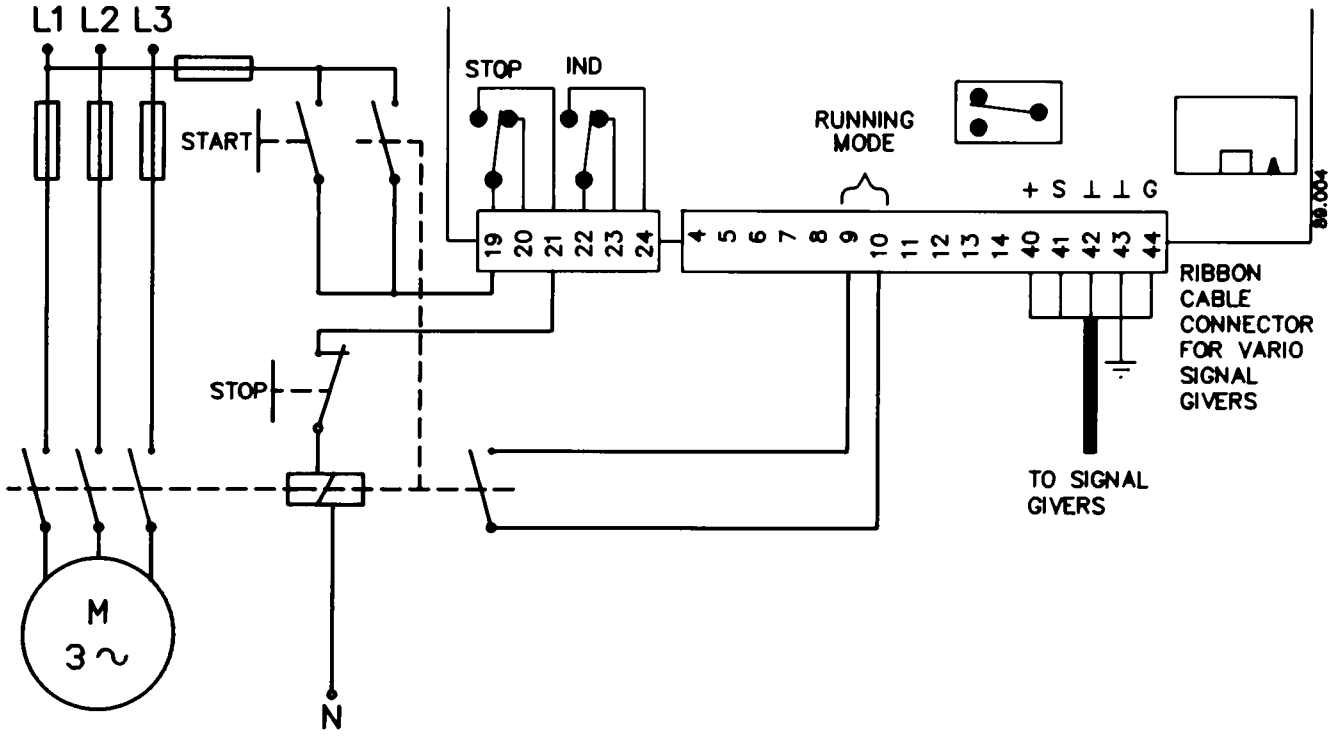
1. The central control unit

The central control unit can be fitted near or in the control box of the machine. Consider if it is important that the operator can see the light emitting diodes inside the box.

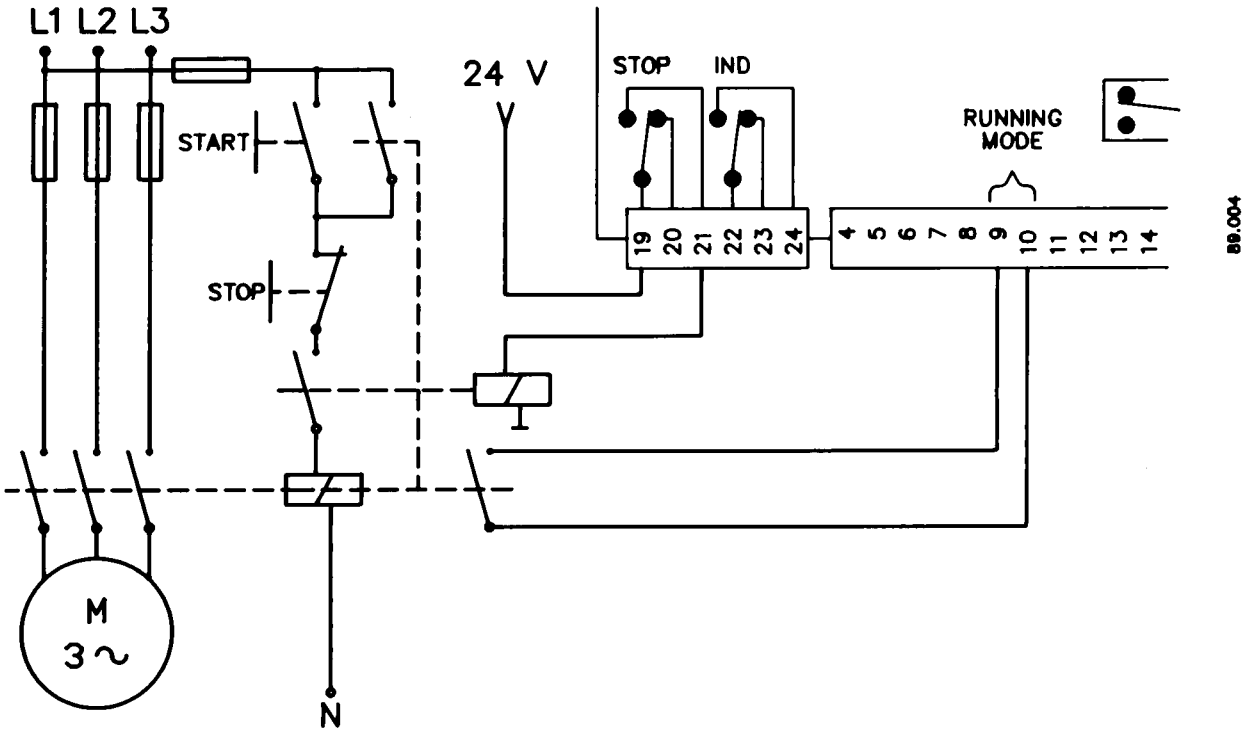
It is necessary to make a connection to the running mode input, otherwise the unit will not work at all.

Please note that the **stop relay** is energized when the machine is running. In the drawing it is shown deenergized.

a) If the DIP switch on the unit is set to **start delay**, the connection in a small system can be made like this:

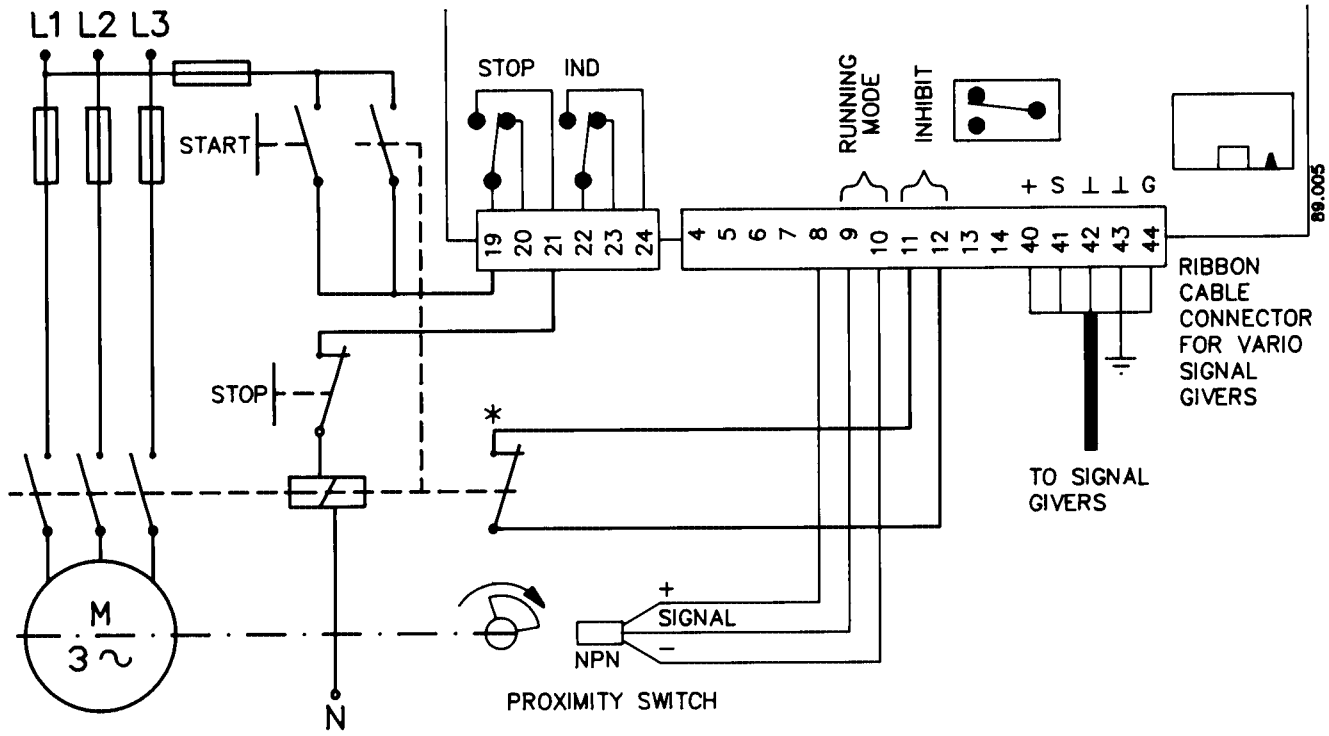


In a larger system and especially when frequency controlled motors are used, it is advisable to use an intermediate relay. This will avoid switching heavy current loads close to the electronic circuits.

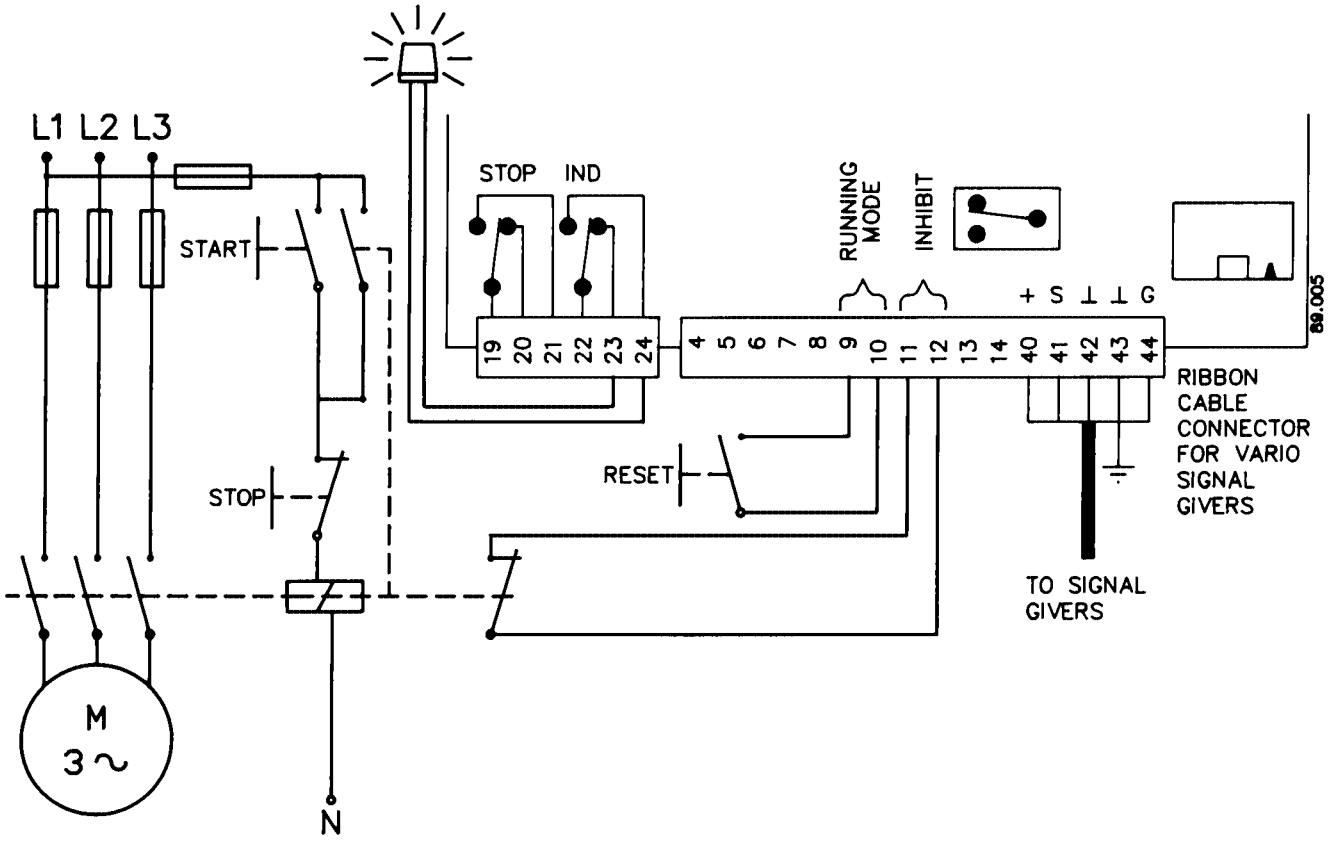


b) If the DIP switch on the unit is set to **speed dependent sensing**, the connection can be made like this:

* If the machine is stopped with brakes and can come to a standstill in less than one revolution, make this connection to avoid false indication.

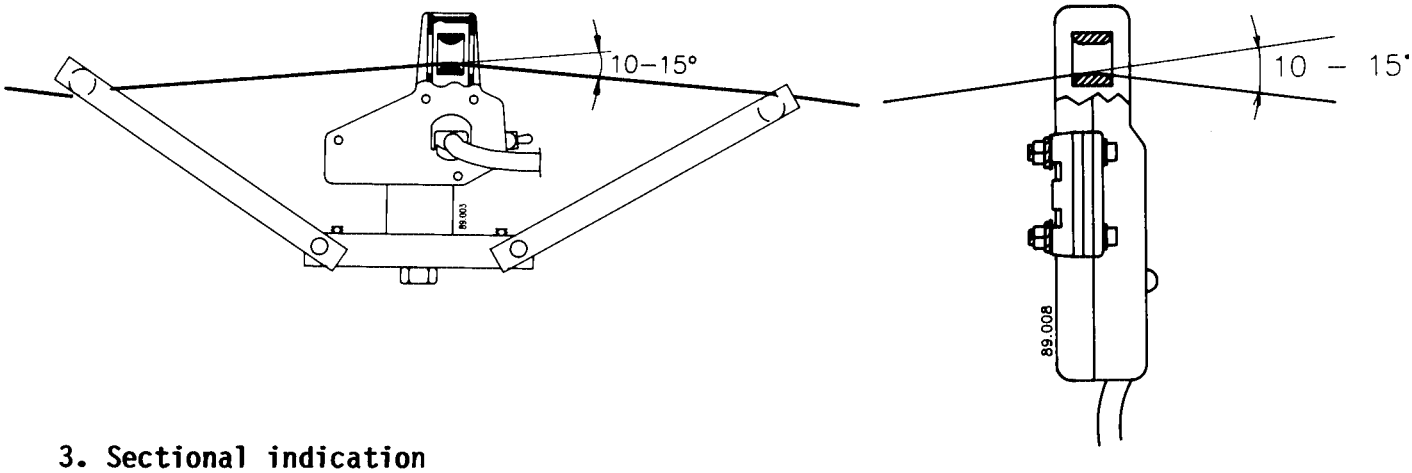


c) If the stop motion must not stop the machine, but only give the operator a warning, the central control unit can be connected like this. The operator must press the reset button as soon as a thread or wire is repaired and runs again.



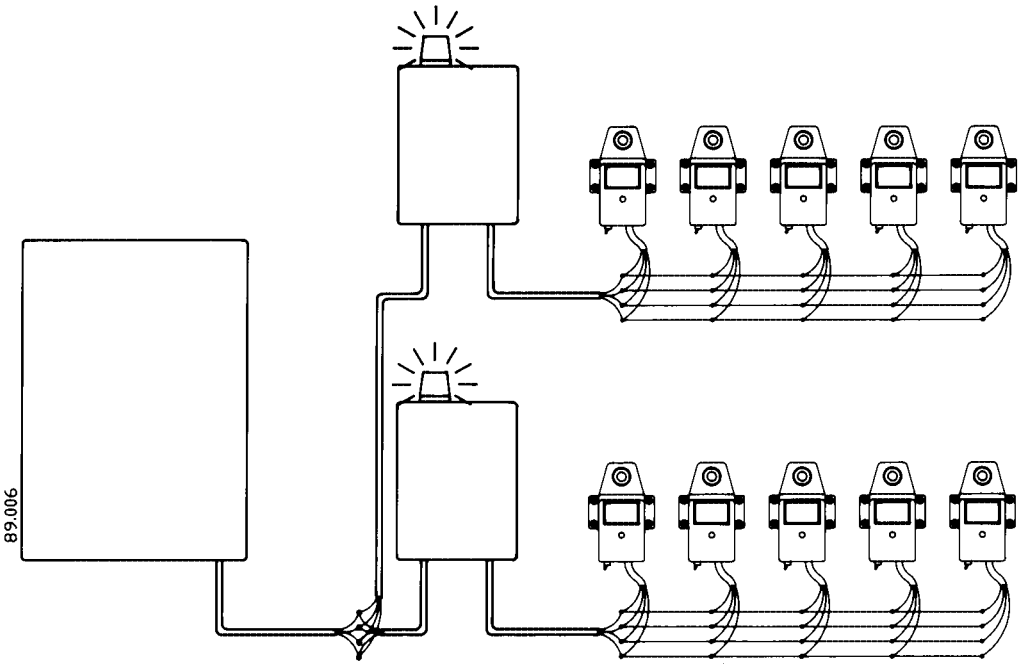
2. The signal giver

The signal giver must be fitted so, that the thread or wire is touching the ceramic eyelet continuously. The movement will be detected most efficiently, if the thread or wire deviates about 10 - 15^{o} when it is passing the signal giver eyelet.
The cover of the signal giver is connected to ground via the cable. Avoid fitting them so that the cover is touching the machine frame, as this will form a ground current loop. This is disadvantageous in the respect of electrical interferences.
If the signal givers are fitted on a machine with a lot of vibrations, it is advisable to fit them on antivibration pads. Eltex supplies antivibration pads for most applications.
The signal givers will be connected in parallel to the central control unit.



3. Sectional indication

If it is necessary to get an indication from different sections of the machines, indication boxes with art. no. 15770 can be connected between the signal givers and the central control unit.
The box contains a relay for an indication lamp.
Up to 20 signal givers can be connected to each indication box.



FAULT FINDING

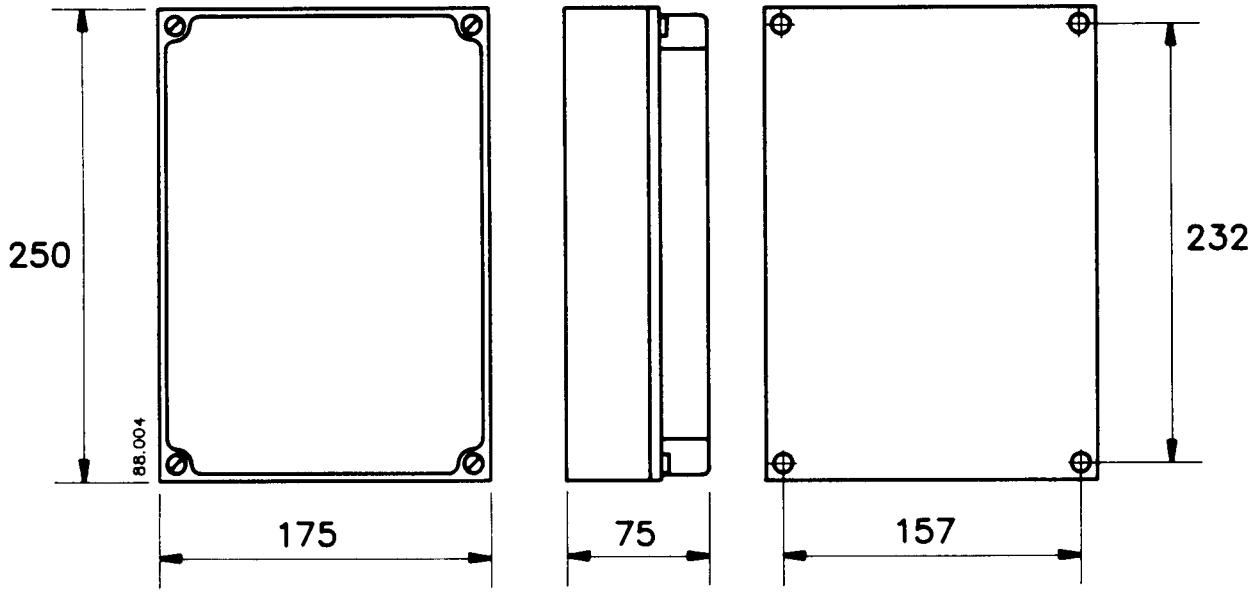
If you have reason to believe that the setting of the DIP-switches can be wrong, check the setting first according to point 1 on page 4. Any type of fault can occur if the setting is wrong.

The stop motion stops the machine as soon as it is started If the machine still stops immediately after it is started. No LED is on.	a) If the DIP switches on the unit are set to **start delay:** set the start delay to maximum (fully clockwise position). b) If the DIP switches on the unit are set to **speed dependent sensing:** set the speed dependent sensing to high speed (fully counter clockwise position). Check if: a) the wires are correctly connected to the stop relay. b) the power supply fuse is blown. c) the supply voltage from the power supply is missing. d) the connection between machine and stop relay is faulty. e) the central control unit is defective.
The machine stops as soon as the green LED "SENSE" turns on	1 The red LED "STOP" is on. a) The GAIN potentiometer is set too low. b) The thread is not running properly in the signal giver that is indicating stop. c) The signal giver indicating stop is faulty. d) If the DIP switch is set to **start delay,** the delay time is too short. If the DIP switch is set to **speed dependent sensing,** the sensing starts at too low speed. 2 Both the red LED "STOP" and "ANTI" is on. a) The stopping signal giver has the switch in "OFF"-position even if the thread is moving. b) If the switch is in "OFF"-position and no thread is moving in the eyelet, an external interference can cause a signal in the signal giver. The interference can be electrical or for example the sound of escaping compressed air, or mechanical vibrations. Eliminate the interference and reduce the gain setting if possible. c) The signal giver is defective.
The machine stops at any time without reason	1 The red LED "STOP" is on. a) The GAIN setting is too low. b) The thread is not running properly in the eyelet of the signal giver. c) The signal giver is defective. 2 Both the red LED "STOP" and "ANTI" is on. a) The GAIN setting is too high. b) See point 2 b above.

The stop motion does not stop when the thread is faulty	1 The red LED "INHIBIT" is on. There is a connection on the inhibit input between no. 11 and 12 on the edge connector of the central control unit. 2 The green LED "SENSE" is not on while the machine is running. a) If the DIP switches on the unit are set to **start delay**, the contact on the machine connected to the running mode input does not close when the machine is started. b) If the DIP switches on the unit are set to **speed dependent sensing**, the speed dependent sensing potentiometer is set to too high speed, or the proximity switch is defective or it does not give any pulses for other reasons. c) The central control unit is defective. 3 The red LED "STOP" lights but the machine does not stop. a) The machine stop is incorrectly connected to the 6-pole edge connector of the central control unit. b) The central control unit is defective. 4 The green LED "SENSE" is on. I None of the signal givers stops. a) The GAIN voltage is too high. b) The signal givers are incorrectly connected to the central control unit. II One of the signal givers does not stop. a) The signal giver is defective.

Dimensions

Central control unit



Supply voltage	230 V (200-265 V)
	290 V (260-350 V)
	400 V (340-455 V)
	440 V (396-528 V)
	550 V (495-660 V)
Relay contact load	2 x 1 A / 125 V AC or
	2 x 2 A / 30 V DC

Eltex of Sweden AB

is an innovative company manufacturing and marketing high-technology electronic equipment.
The company was founded in 1964 and has affiliated companies in many countries.
Today, Eltex employ people worldwide.

Eltex of Sweden AB is the market leader in the world of electronic yarn movement detectors for textile machines. We have a large range of control equipment and load limiters for electrical heating systems, and also power selectors for central heating systems (oil-gas-electric).
Eltex also manufacture data acquisition systems for online operation and small data loggers for temperature, air humidity, voltage and current.

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