Manual

QTV 11400 Yarn Detection System

TH-0233-03

ELTEX
OF SWEDEN

Contents

Manual QTV Yarn Detection System

Overview.

The QTV 11400 yarn detection system is designed to be used in a multithread application. It is a self learning system with yarn sensors near the bobbins for fast reaction time. Every yarn sensor has a red indication LED, which main use is to indicate yarn break.
It is possible to divide the yarn sensors into two branches, branch 1 and 2, were branch 1 can be used for the left side of the creel and branch 2 for the right.
The yarn sensors have the ability to learn if they shall detect yarn or not. The operator sets the sensors in learn mode either via menus in the central control unit or with a special learn button. After a few seconds the central control unit stops the machine and displays number of yarns that was moving. The yarn sensors also indicates on their red LED's if they has been learned to detect yarn. The central control unit remembers the learn status when the system is powered off and initialises the yarn sensors the next time it is switched on.
The yarn sensors sensitivity can be changed via the menus in the central control unit. A value between 0 and 36 can be entered.
Yarn break detection is the primary function for this system but it is also possible to detect yarns that shouldn't be moving. This is called anti check and can cause an anti stop if it is enabled. There are three available settings which can be selected from the central control unit, 'off', 'at machine start' and 'on'. If 'off' there will be no anti check, if 'on' the check will be on as long as the machine is running and if 'at machine start' the check will only be on a few seconds after the machine has started.
An anti stop will be indicated the same way as yarn break, which means on the central control unit, on the indication box lamp and on the yarn sensors red led. The flashing rate however is different.
To be able to start detection as soon as possible after the machine has started, one of two detection control modes, time or speed, can be selected.
If time mode is used, different start and run values can be selected for yarn sensors. How long the start values shall be active can also be selected. Yarn detection is started after a start delay which is adjustable.
If speed mode is used, three different yarn sensor settings for three different speeds can be set. Yarn detection is started at a adjustable speed.

Explanation of the parts in the system.

The QTV yarn detection system includes a central control unit 11400, indication boxes 11331, QTV yarn sensors 173xx and terminators 75012.
The central control unit 11400 initialises and collects information from the yarn sensors. It also stops the creel machine in case of a yarn break or false yarn signal. It has the possibility to control the yarn sensors directly without going through an indication box and it is also possible to divide the boxes and the yarn sensors into two branches, branch 1 and 2.
The indication box 11331 buffers the signals to and from the central control unit, yarn sensors and other boxes. It also acts as a distributed power supply for its connected yarn sensors.
The yarn sensor 173xx makes use of an, by ELTEX, specially designed ASIC to do the actual work. The central control unit just has to initialise it and tell it to start detecting. After that it works on its own until it is told to stop detecting.
The QTV bus terminator is used to filter and return signals. It is positioned at the end of the cable that connects the yarn sensors to the box.
A functional block diagram of the system can be seen in figure a.

The central control unit 11400.

The central control unit is the interface between the yarn sensors and the machine. It is connected to the yarn sensors either directly or via indication boxes 11331. There are two outputs, **1** and **2**, which are

normally used for grouping the yarn sensors in a left and a right side. The outputs can be disabled on the central control unit in case of any maintenance on one side of the creel is needed while the other side is used for production.
The central control unit has a 3-pole, a 15-pole, a 4-pole and a 10-pole divisible terminal. It also has two male 10-pole header connectors and two male 10-pole picoflex connectors. The inputs and outputs are shown in figure b and explained in table a.

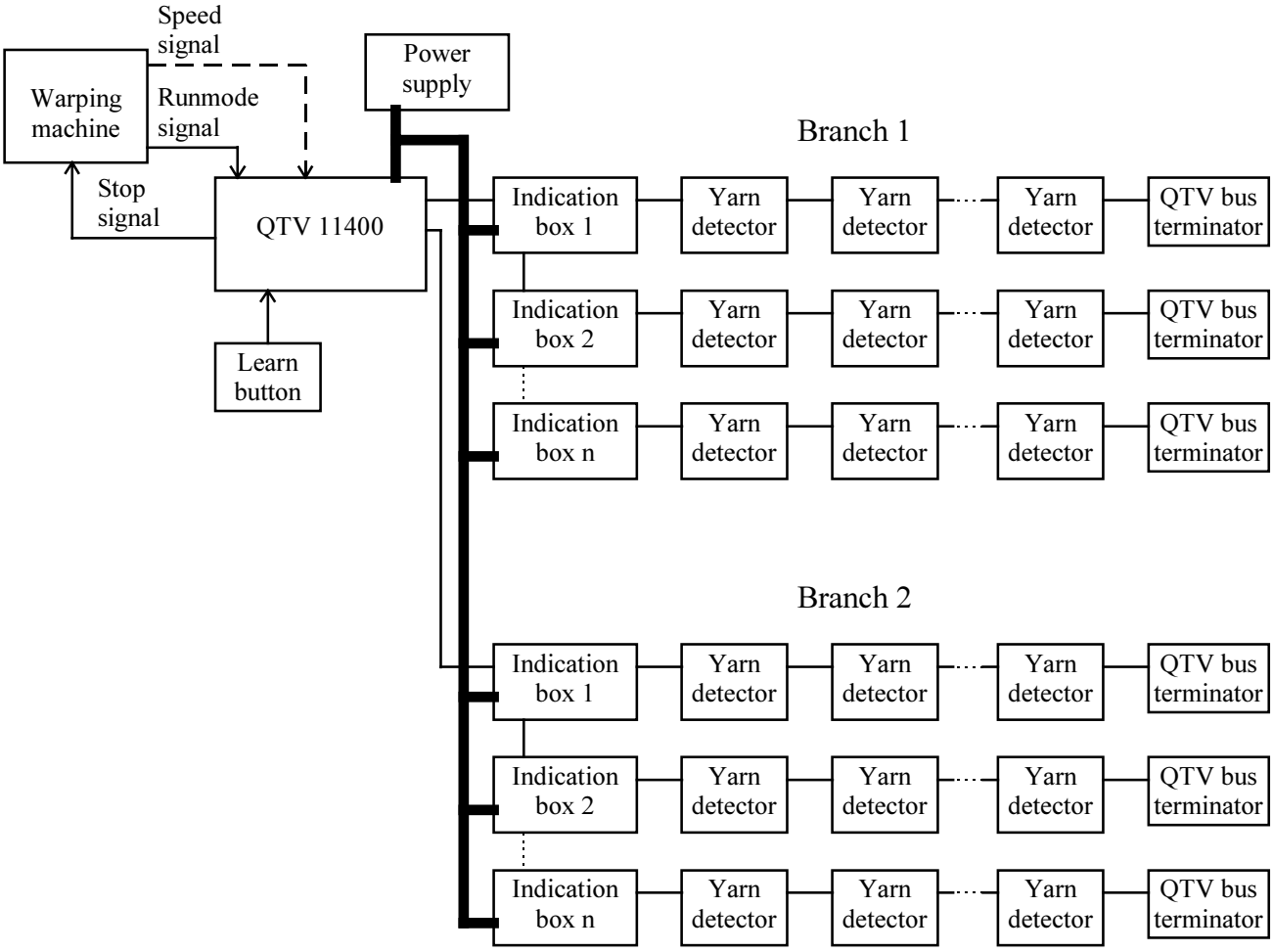


figure A: Functional block diagram for 11400 yarn detection system

There are also two LED's, one green and one red. The green LED has two and the red LED has three modes. They are listed under **Indicators**.

The indication box 11331.

The red indication lamp is used for indicating yarn errors (see **Indicators**).
The box has 7 connectors. Four of them, labelled 1 to 4, are used for connecting the yarn sensors to the box. The one labelled IN is for the cable coming from the central control unit or the previous box. The one labelled OUT is for connecting the box to the next one. On the last box it is not used. Finally the one to the right labelled + and - is where to connect the 24V from the power supply.

On the top left of the PCB there are five jumper positions labelled 0,1,2,3 and 4. Under number four it says NUMBER OF USED CONTACTS. The jumper must be placed in the position that corresponds to the number of used yarn sensor outputs. If for example two outputs are used, the jumper shall be placed at position 2. The yarn sensor outputs must be used continuously from left to right. It means that when using one output, connector 1 must be used, with two outputs, connector 1 and 2 and with three outputs, connector 1, 2 and 3 must be used. How many outputs that will be used normally depends on the physical layout of the creel.

Connector	*Name*	*Pin/term. number*	*Description*
PL3	----	1-10	When using indication boxes, the connection shall be made to this one. This connector is for branch 1.
PL4	----	1-10	Same as PL3 but for branch 2.
PL5	----	1-10	The central control unit has the possibility to control the yarn sensors directly without going through an indication box. Since the yarn sensors are powered via the '15V IN' input, the number of yarn sensors that can be controlled this way depends on the current available at the '15V IN' input. This connector is for branch 1.
PL6	----	1-10	Same as PL5 but for branch 2.
PL7	Stop Relay	1,2,3	Relay output 5A/280V AC, 5A/20V DC, 0.2A/300V DC. Energised when central control unit wants to stop machine.
PL8	24V DC	1,2	Input for power supply 20-30V DC.
	Runmode signal	3,4,5,6	Rectified input, 15-30V DC. Used for the 'runmode signal', i.e. a signal coming from the machine telling the central control unit when the machine is running
	Speed signal	8	Input for speed signal, either 15-30V DC pulses or by opening and closing term. 8 and 7. Normally a PNP proximity switch is used to measure the machine speed. In this case plus is connected to 7, minus to 9 and signal to 8.
	Learn button, IN2	10,11	Input for learn button. Learn mode will be activated when term. 10 and 11 are shortened.
	Clamp control, IN3	12,13	For Eltex yarn sensor with clamp function. With term. 12 and 13 shortened the clamp will be opened.
	IN4	15	Universal input, 15-30V DC. Not used.
	-	6,9	All inputs and outputs are opto isolated. This ground is connected to the primary side of the opto couplers and has no connection with pole 2 in this connector. It is however connected to term. 6 on PL9.
	+	7,10,12,14	These terminals are connected to term. 5, '15V IN' on PL9. They are normally used as source to the nearby inputs via a relay or button. See 'Learn button, IN2' for an example. They shall not be used for any other purpose.
PL9	24V DC	1,2	These terminals are directly connected to term. 1 and 2 on PL8. They are used as outputs to power the microprocessor board.
	15V OUT	3,4	In the central control unit a regulated 15V DC is created from the 24V input. Term. 4 has the same ground as term. 2 but if the primary and secondary side of the opto couplers can have the same ground this output can be used to power the primary side by connecting 3 to 5 and 4 to 6.
	15V IN	5,6	The primary side of the opto couplers needs to be powered by a regulated 15V DC. If the primary and secondary side of the opto couplers can have the same ground the '15V OUT' can be used by connecting 3 to 5 and 4 to 6.
	IND 1	7,8	Relay output, 2A/120V AC, 4A/30V DC. Energised when machine is stopped because of yarn error in branch 1.
	IND 2	7,8	Relay output, 2A/120V AC, 4A/30V DC. Energised when machine is stopped because of yarn error in branch 2.
PL10	-	1	Ground reference for I2C serial communication. Used with pin 2 and 3 to expand central control unit with external I2C-units.
	SDA	2	Data input/output for I2C serial communication. Used with pin 1 and 3 to expand central control unit with external I2C-units.
	SCL	3	Clock output for I2C serial communication. Used with pin 1 and 2 to expand central control unit with external I2C-units.
	+	4	Not connected.

table A: Central control units inputs and outputs

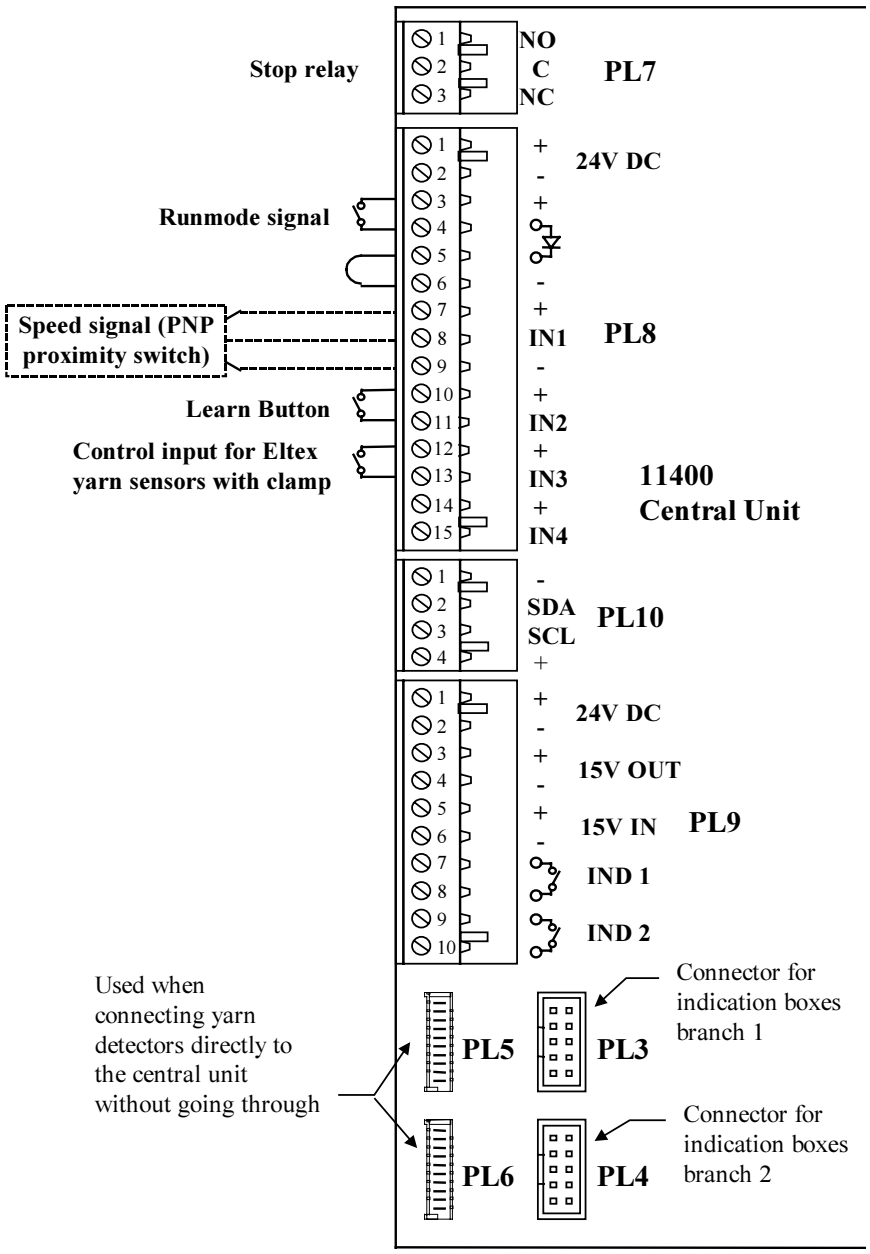


figure B: Inputs and outputs for central control unit 11400

The yarn sensor.

The yarn sensor 173xx talks to the central control unit via a serial protocol. By sending commands to the yarn sensor, it can be told to detect yarn breaks and false yarn movement and to learn if it should have yarn or not. The values in the yarn sensor, such as yarn sensitivity and reaction time can also be changed. It has a red LED which is used for indicating type of yarn error. The modes are listed under **Indicators**. There are no hardware switches that need to be set. All the yarn sensors are identical. The reason that they still can be individually addressed is the specially coded yarn sensor cable.

Indicators.

On the central control unit 11400 there are two LED's, one green and one red, the indication box 11331 has one lamp and the yarn sensor has one red LED. The usage is described in the following table.

Indicator	*Yarn detection off*	*Yarn detection on*	*Yarn break stop*	*False yarn movement stop*	*Error indication*
Central control unit green LED	On	Flashing	**---**	**---**	**---**
Central control unit red LED	**---**	**---**	ON	Slow flashing	Fast flashing
Indication box lamp	**---**	Off	ON	Slow flashing	**---**
Yarn sensors red LED	**---**	Off	ON	Slow flashing	**---**

--- = undetermined

Yarn sensitivity

Some times it is necessary to change the sensitivity in the yarn sensors when the yarn type is changed. For the operator to be able to change without having to modify the installation values, three yarn types, fine, medium and coarse, can be selected. The sensitivity value for each yarn type is set in INSTALLATION - GIVER VALUES - CHANGE VALUES. Whenever the yarn sensors are relearned, either with menu DETECTION - RELEARN or by using a learn button, a question asking for yarn type will appear on the central control units display. The operator must select between 'Fine', 'Medium' and 'Coarse' yarn and confirm with the ENT-button or cancel the relearn with the ESC-button.
If it isn't necessary to change sensitivity, the 'yarn type'-question can be disabled by setting all three sensitivities in INSTALLATION - GIVER VALUES - CHANGE VALUES to the same value.

Detection control mode

Since the signal from the yarns depends on the yarn speed, the yarn detection can not be started until the speed is high enough. Another problem is that because of the elasticity of the yarns, at low speed the yarn sensors far away from the warping machine will see gaps in the signal. The first problem is solved by disabling the yarn detection until the speed is high enough and the second by setting different yarn sensor dropout and anti delays for different yarn speeds. This yarn detection system has built in functions to solve both these problems.
The yarn detection can be controlled in two ways, by time or by speed. This is selected under menu INSTALLATION - SYSTEM VALUES.

Time: When this is used, the yarn detection starts a adjustable number of seconds after the machine is started. Then the start delays are written to the yarn sensors. After another adjustable delay, the values in the yarn sensors are changed to run delays.
The different values are,
Start up delay: This is the time between start of machine and start of yarn detection. It is needed to give the machine time to speed up.
Start/Run dropout delay: The time a yarn sensor can be without signal before it stops for yarn break.
Start/Run anti delay: The time a signal must be present before the yarn sensor see it.
Duration for start delays: The time after start of yarn detection that the yarn sensors will use the start delays.

The value for 'start up delay' is set in menu INSTALLATION - SYSTEM VALUES. The other values are set in menu INSTALLATION - GIVER VALUES - CHANGE VALUES.

Speed: When this is used, the yarn detection starts when the machine is running and the speed is over a adjustable low speed. Then delays for low speed is written to the yarn sensors. At a adjustable medium speed, the values are changed and at another adjustable high speed, the values are changed again.

The different values are,

Beginning of low speed: This is the start speed for the yarn detection and also for the low speed delays.

Beginning of medium/high speed: Speed when the yarn sensors change to medium/high speed delays.

Drop out delay for low/medium/high speed: The time a yarn sensor can be without signal before it stops for yarn break.

Anti delay for low/medium/high speed: The time a signal must be present before the yarn sensor see it.

All values are set in menu INSTALLATION - GIVER VALUES - CHANGE VALUES.

When time mode is used, only the runmode signal is needed. If speed mode is used, both a runmode signal and a speed signal is needed. For a more detailed description of runmode and speed signals, see figure b and table a.

Statistics in the central control unit

The central control unit stores statistics about number of stops and time. It stores it in two ways. resettable (menu STATISTICS-RESETTABLE) and continuous (menu STATISTICS-CONTINUOUS). Resettable means that the statistics can be cleared by the operator via the menu. The continuous statistics can't be cleared.

No of stops are displayed in four different ways, yarn breaks, anti stops, other stops and total stops.

Yarn breaks displays no of stops caused by a yarn break.

Anti stops displays no of stops caused by a unwanted yarn movement.

Other stops displays no of stops not caused by any of the two above.

Total stops is a summary of the three stop types.

The maximum number of stops that can be displayed is 999 999 999 except for total stops which is 3 999 999 996.

The stops are seen in menu STATISTICS-RESETTABLE -SHOW STOPS and STATISTICS-CONTINUOUS-SHOW STOPS.

Time is displayed as run time, stop time and total time.

Run time is the time the machine has been running.

Stop time is the time the machine has been on but not running.

Total time is a summary of the run and stop time.

The time is displayed in hours and minutes with a maximum of 499 999 hours and 59 minutes except for total time which is 999999 hours and 58 minutes.

The times are seen in menu STATISTICS-RESETTABLE -SHOW TIME and STATISTICS-CONTINUOUS-SHOW TIME.

The statistics can be cleared with menu STATISTICS-RESETTABLE-CLEAR. Only the statistics under the RESETTABLE-menu is affected.

Recommended mounting positions.

The central control unit shall preferably be positioned nearby the creel machines manoeuvre panel. The indication boxes are meant to be placed on top of the creel to minimise cable length to the yarn sensors. To get an early warning the yarn sensors shall be placed as near the bobbins as possible. They should have some kind of yarn brake before them.

Power supply.

The complete system shall be powered by 20-30V DC. The maximum current consumption for the different parts is as follows. Central control unit=250mA, each box=100mA, each yarn sensor (type 17310, 17320 or 17321) =25mA. The total maximum current for a system with 20 boxes and 800 yarn sensors will be 250 + 100*20 + 25*800=22250 mA = 22.25 A.

Cable installation.

(For installation of the ICON system 1736x, see separate instruction.)
Needed for this system are cables for connecting the power supply to the central control unit and the indication boxes, shielded 10 pole ribbon cable between the central control unit and the box (custom designed by ELTEX), 10 pole ribbon cables, 65553, between the boxes and specially prepared 10 pole ribbon cables, 65552, to connect the yarn sensors to the box. Some additional cables are also needed to connect the stop signal, the runmode signal, the learn button and if necessary the speed signal.
The power supply cables must be large enough and short enough to keep the voltage drop in the ground cable between indication boxes and between central control unit and box below 0,5 volt. This is important since the ground lead is the reference for all signals going to and from the boxes.

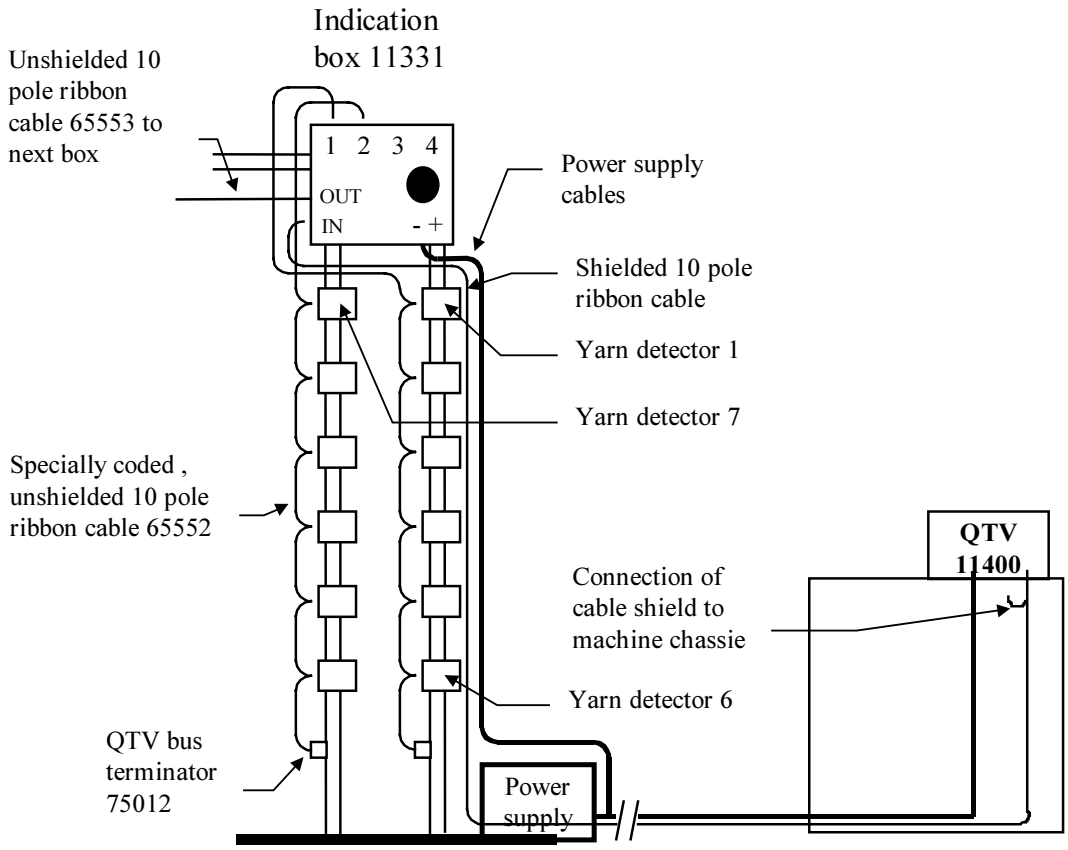


figure C: Example of a cable installation for a creel, left side

The central control unit is normally placed nearby the machines manoeuvre panel. This may introduce interference into the ribbon cable, thus disturbing the communication to and from the boxes. The solution to this is to use a shielded ribbon cable between the central control unit and the first box.
The yarn sensors are all identical. They have no pre-programmed addresses, but still one can be selected out of thousands. The secret is the ribbon cable that connects the yarn sensors to the box. This cable has been coded by alternately cutting lead 3 and 8. It is important that between the connectors either 3 or 8 is cut and it can't be the same one from the connector as it was to it.
The stop signal in figure a is actually a relay output. It shall sit in the manoeuvre circuit together with the normal stop button. The relay is energised when the machine shall be stopped.

The runmode signal into PL8 can be realised in two different ways, either a signal, 15-30V DC into pin 4 and 5 or using a relay between 3 and 4 and connecting 5 and 6 to each other.
The speed signal is pulses from the machine with period time proportional to machine speed or yarn speed. This is best realised with a PNP proximity switch.
For a more detailed description of runmode and speed signals, see figure b and table a.
What the learn button shall do is to shorten 10 to 11 on PL8.
An example of a cable installation for a creel, left side, can be seen in figure c.
The indication box 11331 in figure c controls, with the two yarn sensor outputs labelled 1 and 2, 2 sections with 6 yarn sensors in each section. Every yarn sensor gets a number which depends on which of the four terminals on the box that is used and where on the cable the detector is connected. The first detector connected to terminal 1 will be getting the number 1 and the last connected to terminal 1 will be getting the number 6. The first detector connected to terminal 2 will be getting the number 7 and the last will be getting the number 12. If the system is mounted on the left creel the yarn sensors shall be numbered top-down, right to left. To accomplish this the rightmost section uses terminal 1 and section 2 from the right uses terminal 2 and the yarn sensors are connected from top to bottom.

Grounding

The creel shall be connected to earth. This will, via the yarn sensors, connect the 24V minus to earth so the 24V power supply shall not be grounded.
The shield for the ribbon cable shall be connected to earth with a stub as short as possible. The shield shall only be grounded in one end, preferably to machine chassie at the central control unit.

How to use the central control unit software.

The program uses a menu system. The active menu is shown on top of the LCD and three of the possible menu choices are shown on the following rows. At the end of a menu choice there is either a ☐ or a #. The ☐ means a normal menu but # indicates a protected menu. To select a normal menu you only have to place the cursor on the menu and press ENT. To select a protected menu you have to press the ENT twice with only a short delay in between.
If there are more than one menu choice, one or two arrows will appear in the rightmost column. These signs appear when the function keys F1-F4 can be used. The sign on row 1 tells the function for F1, row 2 is for F2, row 3 is for F3 and row 4 is for F4.
To select a menu you have to place the cursor on the same row as the wanted menu item. To do this use the up and down arrow, F1 and F4. When the cursor is on the correct row press ENT once for a normal menu and twice for a protected menu. To go back to previous menu press ESC. When a menu has sub menus you can see it on the two dots at the end of the menu name.
A typical menu could look like this:

```
   **MAIN MENU**   ↑
DETECTION..     ☐
STATISTICS..    ☐
SERVICE..       #  ↓
```

Here MAIN MENU is the active menu. It has at least three sub menus, DETECTION, STATISTICS and SERVICE. Of these three DETECTION and STATISTICS are normal menus, the third is protected. You can see on the dots at the end of the menu names that all have sub menus. F1 is used to move cursor up and F4 to move it down (arrows to the right).

The complete menu structure is as follows:

MAIN MENU
- DETECTION
  - RELEARN
  - SHOW LEARNED
- STATISTICS
  - RESETTABLE
    - SHOW TIME
    - SHOW STOPS
    - CLEAR
  - CONTINUOUS
    - SHOW TIME
    - SHOW STOPS
- SERVICE
  - COMPLETE TEST
  - SERVICE HELP
    - PULSE COUNTER
    - LAMP TEST
  - SHOW STATUS
  - BRANCH MODE
- INSTALLATION
  - SYSTEM VALUES
  - GIVER VALUES
    - CHANGE VALUES
    - UPDATE GIVERS
    - FACTORY VALUES
  - BOX VALUES
    - CHANGE VALUES
    - UPDATE BOXES
    - FACTORY VALUES
  - BRANCH MODE

MAIN MENU is where the program starts after power on. It has four sub menus.

DETECTION is where the functions for yarn detecting is grouped. It has two sub menus.

RELEARN is the same as pressing the learn button and is used for relearning the yarn sensors for another set of yarns. When the relearn is complete the machine stops and number of yarns are shown on the LCD.

SHOW LEARNED. When this is activated number of yarns are shown on the LCD and the red LED is lit on all the yarn sensors learned to have yarn. If a yarn error occurs when this menu is active, the LED on the yarn sensors will change to indicate yarn error.

STATISTICS has two sub menus.

RESETTABLE contains menus for the statistics that can be cleared. It has three sub menus.

SHOW TIME displays the stop time, run time and total time since the last clear was made. An explanation of the time statistics can be found in statistics in the central control unit**.**

SHOW STOPS displays number of yarn breaks, anti stops, other stops and total stops since the last clear was made. An explanation of the stop statistics can be found in statistics in the central control unit**.**

CLEAR clears the statistics under the RESETTABLE menu.

CONTINUOUS contains menus for the continuous statistics. It has two sub menus.

SHOW TIME displays the stop time, run time and total time since the system was installed. An explanation of the time statistics can be found in statistics in the central control unit**.**

SHOW STOPS displays number of yarn breaks, anti stops, other stops and total stops since the system was installed. An explanation of the stop statistics can be found in statistics in the central control unit**.**

SERVICE is a protected menu and has four sub menus.

COMPLETE TEST is the same as the poweron test. It tests the whole system as accurate as possible.

SERVICE HELP contains various help functions for service and installation.

PULSE COUNTER displays pulses/min for IN1, the input used for measuring the yarn speed and controlling the yarn detection. Read more in Detection control mode.

LAMP TEST turns on the lamp on all indication boxes, the led on all yarn sensors and the red errorled on the central control unit. Can be used to find defect indication boxes or yarn sensors.

SHOW STATUS displays different data concerning the QTV system.

BRANCH MODE makes it possible to disconnect one or both branches. Step through the two branches with ENT and toggle between 'enabled' and 'disabled' with F4. When a branch is disabled no errors for that branch are detected, not even with COMPLETE TEST. The yarn detection doesn't work either.

INSTALLATION is a protected menu and has four sub menus. They are explained in configuring the central control unit software.

Configuring the central control unit software.

INSTALLATION has four sub menus.

SYSTEM VALUES sets the global parameters and are the following.

No of boxes in branch 1: To make accurate tests on the system the program has to know how many indication boxes that are used. Just input the correct number.

No of boxes in branch 2: Same as above.

Detection control mode: The yarn detection can be controlled in two different ways, with time or with speed. What they mean is explained in detection control mode.

Start up delay: When the machine starts, the program need to wait a little before starting the yarn detection so the yarn speed is fast enough to create a valid signal on the yarn sensors. This selection only appears if the previous 'Detection Control Mode' is set to time. Input the desired no of seconds.

Status display: When this is on, status messages will be shown on the LCD, providing the menu system is active and no button has been pressed within 10 seconds. These messages consists of information about the system, how many boxes and yarn sensors that are connected, how many yarns that are detected and so on. Toggle on/off with F4.

Anti signal test: The program also has the possibility to check the yarn sensors that have not learned to have signal. This is called anti signal test and means that if a yarn sensor that isn't learned to have signal senses a yarn movement it will stop the machine and the red LED and the associated box lamp will flash. This test can be toggled between off, on (always) and on for a few seconds at each machine start. The first or last mode may be necessary if for example there are vibrations that cause temporary false signals. Toggle between modes with F4.

Clamp control mode: For ELTEX clamp yarn sensors, the clamps can be controlled in three different ways, external, time and speed. Toggle between modes with F4.

External means that the clamps are controlled only by the input IN3 (see figure b and table a). Closing 12 and 13 in PL8 allways opens the clamps regardless of mode.

Time means that the clamps are closed a certain time after the machine has started.The time is in seconds and is set under GIVER VALUES.

Speed means that the clamps opens at a certain speed detected by IN1 (see figure b and table a). The speed is in pulses/min and is set under GIVER VALUES.

GIVER VALUES has three sub menus.

CHANGE VALUES sets the yarn sensor values and the following three may be altered.

Sensitivity level: The yarn sensors can be set to 37 different sensitivity levels were 0 is the least sensitive and 36 is the most sensitive. A too low level will cause a false yarn break stop and a too high level may cause a false anti signal stop.

Three different sensitivity levels can be set, 'Sensitivity level for fine yarn', 'Sensitivity level for medium yarn' and 'Sensitivity level for coarse yarn'. A detailed explanation can be found in yarn sensitivity**.**

Beginning of low/medium/high speed: If 'Detection Control Mode' in INSTALLATION - SYSTEM VALUES is set to speed, these values can be changed. They determine the start speed for the different dropout and anti delays and also the speed when yarn detection starts. A detailed explanation can be found in detection control mode.

Drop out delay: This delay is meant to bridge short gaps in the signal, thus making it look continuous for the yarn sensor. A too short value will cause false yarn break stop since the short signal gaps wont be overlapped and a too large value will give the yarn sensor an unnecessary slow reaction time.

If 'Detection Control Mode' in INSTALLATION - SYSTEM VALUES is set to **time**, two different delays can be set, 'Start Drop out delay' and 'Run Drop out delay'.

If 'Detection Control Mode' is set to **speed**, three different delays can be set, 'Drop out delay for low speed' 'Drop out delay for medium speed' and 'Drop out delay for high speed'.

A detailed explanation can be found in detection control mode.

Anti delay: A signal will not be valid unless it is longer than this delay which makes it possible to filter out short spikes. A too short value here will make the yarn sensor sensitive for interference and vibrations and can cause a false anti signal stop or prevent a yarn break to be detected. A too large value will make the yarn sensor more insensitive and may cause a false yarn break stop.

If 'Detection Control Mode' in INSTALLATION - SYSTEM VALUES is set to **time**, two different delays can be set, 'Start anti delay' and 'Run anti delay'.

If 'Detection Control Mode' is set to **speed**, three different delays can be set, 'Anti delay for low speed' 'Anti delay for medium speed' and 'Anti delay for high speed'.

A detailed explanation can be found in detection control mode.

Duration for start delays: This value determines the number of seconds after start of yarn detection that the start delays shall be used. The selection only appears if 'Detection Control Mode' in INSTALLATION - SYSTEM VALUES is set to time. A detailed explanation can be found in detection control mode.

Clamp opening speed: If 'Clamp Control Mode' in INSTALLATION - SYSTEM VALUES is set to speed, this value can be changed. It determines the speed where the clamps should open. For this to work properly the speed input IN1 should measure the yarn speed, not the machine speed.

Duration for closed clamp: If 'Clamp Control Mode' in INSTALLATION - SYSTEM VALUES is set to time, this value can be changed. It determines how long the clamps should be closed after the machine has started.

LED mux value and quick read mux value shall not be altered. If they have been altered just use menu FACTORY VALUES and then input again, if necessary, the values for sensitivity, drop out and anti.

UPDATE GIVERS writes the current values to the yarn sensors.

FACTORY VALUES changes the current values to predefined values and writes, if wanted, the new values to the yarn sensors. It can be used as an emergency exit to get out from confusing settings.

BOX VALUES is not used for normal installation.

BRANCH MODE works the same as under SERVICE menu.

Error messages.

When an error is found, either by the power on test or while the machine is running, the central control unit 11401 stops the machine, turns on its red LED and writes an error message to the display. The error messages are divided into three types, system errors, box errors and giver errors.

SYSTEM ERRORS are errors that are caused by the central control unit 11401. On the display is written '*System Error*' and after that one of the following messages:

Illegal Instruction:

Explanation: The microprocessor in the central control unit has encountered an unknown command in its program memory because of interference or defect hardware.

Action: Try replacing the central control unit. If that doesn't help try to find the source of the interference and eliminate it. If that isn't possible contact service personnel.

CPU Oscillator Fail:

Explanation: The crystal for the microprocessor in the central control unit has for a short while stopped oscillating. It is caused by interference or defect hardware.

Action: Try replacing the central control unit. If that doesn't help try to find the source of the interference and eliminate it. If that isn't possible contact service personnel.

Watchdog Reset:

Explanation: The microprocessor in the central control unit has a watchdog that checks that the program is running normally. If this watchdog isn't cleared regularly by the program it will reset the central control unit. That is what has happened here. The reason is interference or defect hardware.

Action: Try replacing the central control unit. If that doesn't help try to find the source of the interference and eliminate it. If that isn't possible contact service personnel.

EEPROM Defect:

Explanation: The microprocessor in the central control unit contains a small memory used for storing installation values. This error means that a write to the memory has failed.

Action: Try replacing the central control unit. If that doesn't help contact service personnel.

BOX ERRORS are errors that are caused by the indication boxes 11331. On the display is written '*Box Error*' and an error message followed by branch number 1 or 2 and sometimes also the box number (Example: *Box Error* No Daisy Return Branch 1, Box 1). If a box error comes when the system is working, write down the error message and then execute COMPLETE TEST under menu SERVICE. If an error is found look below for explanation, if not, contact service personnel about the original error message written down. After every action taken execute COMPLETE TEST again to see if the error has been fixed.

The different box errors are:

Read Parity Error Branch X:

Explanation: The serial communication between the indication boxes and the central control unit includes an even parity check. This error means that the serial message read from the box have been destroyed due to interference or hardware problems.

Action: Execute COMPLETE TEST under menu SERVICE and look up the new error message. If no error is found the problem is most likely interference. Try to find the source of the interference and eliminate it. If that isn't possible contact service personnel.

Send Parity Error Branch X:

Explanation: The serial communication between the indication boxes and the central control unit includes an even parity check. This error means that the serial message sent to the box have been destroyed due to interference or hardware problems.

Action: Execute COMPLETE TEST under menu SERVICE and look up the new error message. If no error is found the problem is most likely interference. Try to find the source of the interference and eliminate it. If that isn't possible contact service personnel.

Daisy Return Low Branch X[, Box N] :

Explanation: On the 10 pole ribbon cable between the central control unit and the box and between boxes, number 9 is for the box daisy chain return signal. The last box in each branch has the responsibility to return this signal when it comes. This error means that the signal is permanently

held low (zero volt) because of some hardware problem.
Action: If no box number is displayed, execute COMPLETE TEST under menu SERVICE and look up the new error message. Replace indication box N in branch X. If that doesn't work and N says box 1 try to replace the central control unit. Otherwise contact service personnel.

No Daisy Return Branch X[, Box N] :

Explanation: On the 10 pole ribbon cable between the central control unit and the box and between boxes, number 9 is for the box daisy chain return signal. The last box in each branch has the responsibility to return this signal when it comes. This error means that the signal is not returned (15 volt) because of hardware problems or incorrect system values.
Action: If no box number is displayed, execute COMPLETE TEST under menu SERVICE and look up the new error message. Check under INSTALLATION - SYSTEM VALUES that number of boxes are correct because a value larger than the actual number of boxes in the system will cause this error. Check that cable between box N and N-1 isn't broken or disconnected. Replace indication box N in branch X and also try the box before (N-1). If that doesn't work and N says box 1 try to replace the central control unit. Otherwise contact service personnel.

Count Error Branch X:

Explanation: This is an error that only comes when the central control units poweron test or menu command COMPLETE TEST is executed. In both of these tests the central control unit counts number of boxes a few times. This error comes if any of these counts differ from the others. The cause can be either interference, bad cables or defect hardware.
Action: No box number will be displayed for this error so to find it first check for interference then check all the cables between the boxes, replace the central control unit and finally replace all the boxes one at a time. If the problem still exists, contact service personnel.

Early Daisy Return Branch X:

Explanation: On the 10 pole ribbon cable between the central control unit and the box and between boxes, number 9 is for the box daisy chain return signal. The last box in each branch has the responsibility to return this signal when it comes. This error means that the central control unit didn't expect the signal to come back so soon. It is caused by interference or defect hardware.
Action: Execute COMPLETE TEST under menu SERVICE and look up the new error message. If no error is found the problem is most likely interference. Try to find the source of the interference and eliminate it. If that isn't possible contact service personnel.

Stop Line Locked Branch X, Box N:

Explanation: This is an error that only comes when the central control units poweron test or menu command COMPLETE TEST is executed. In both of these tests the central control unit checks line number 7, called box stop line, in the 10 pole ribbon cable. This error comes if the box stop line can't be toggled.
Action: Check that cable between box N and N-1 isn't defect. Replace indication box N in branch X. If that doesn't work and N says box 1 try to replace the central control unit. Otherwise contact service personnel.

Read Line Locked Branch X, Box N:

Explanation: This is an error that only comes when the central control units poweron test or menu command COMPLETE TEST is executed. In both of these tests the central control unit checks line number 2, called box data read, in the 10 pole ribbon cable. This error comes if the box data read line can't be toggled.
Action: Check that cable between box N and N-1 isn't defect. Replace indication box N in branch X. If that doesn't work and N says box 1 try to replace the central control unit. Otherwise contact service personnel.

EEPROM Defect Branch X:

Explanation: The microprocessor in the central control unit contains a small memory used for storing values for the indication box. This error means that a write to the memory has failed.
Action: Try replacing the central control unit. If that doesn't help contact service personnel.

GIVER ERRORS are errors that are caused by the yarn sensors 173xx. On the display is written '*Giver Error*' and an error message followed by branch number 1 or 2 and sometimes also the box number and yarn sensor number (Example: *Giver Error* No Daisy Return Branch 2, Box 3, Giver 2). If a giver error comes when the system is working, write down the error message and then execute COMPLETE TEST under menu SERVICE. If an error is found look below for explanation, if not, contact service personnel about the original error message written down. After every action taken execute COMPLETE TEST again to see if the error has been fixed.
To find some errors a voltmeter is needed. It is also recommended to have a male 10 pole connector like the one in the yarn sensor to be able to measure the pins without the risk to destroy the cable connector.
The different giver errors are:

Read Parity Error Branch X:

Explanation: The serial communication between the yarn sensors and the central control unit includes an even parity check. This error means that the serial message read from one yarn sensor have been destroyed due to interference or hardware problems.

Action: Execute COMPLETE TEST under menu SERVICE and look up the new error message. If no error is found the problem is most likely interference. Try to find the source of the interference and eliminate it. If that isn't possible contact service personnel.

Send Parity Error Branch X:

Explanation: The serial communication between the yarn sensors and the central control unit includes an even parity check. This error means that the serial message sent to the yarn sensors have been destroyed due to interference or hardware problems.

Action: Execute COMPLETE TEST under menu SERVICE and look up the new error message. If no error is found the problem is most likely interference. Try to find the source of the interference and eliminate it. If that isn't possible contact service personnel.

Daisy Return Low Branch X [, Box N] :

Explanation: On the 10 pole ribbon cable that is connected to the yarn sensors, number 5 is for the daisy chain return signal. The QTV bus terminator 75012 in each yarn sensor cable has the responsibility to return this signal when it comes. This error means that the signal is permanently held low (zero volt) because of some hardware problem.

Action: If indication boxes 11331 are used, do the following:

If no box number is displayed, execute COMPLETE TEST under menu SERVICE and look up the new error message. Check that the jumper on the indication box is set on the correct number of used yarn sensor outputs. Remove terminator at the end of the cable connected to the boxes highest used yarn sensor output and measure with a voltmeter between the daisy return signal (pin no 5) and ground (pin no 10). Disconnect the yarn sensors one at a time starting with the first one at the yarn sensor output 1 of the box. When the daisy return signal goes high (15 volts), the defect yarn sensor is found.

If no indication boxes 11331 are used, do the following:

Remove terminator at the end of the yarn sensor cable and measure with a voltmeter between the daisy return signal (pin no 5) and ground (pin no 10). Disconnect the yarn sensors one at a time starting with the first one. When the daisy return signal goes high (15 volts), the defect yarn sensor is found.

If no defect yarn sensor is found, check cables for the yarn sensors or if the daisy return signal is high from the beginning (15 volts), check cables for box N. Then replace indication box N. If that doesn't work and N says box 1, try to replace the central control unit. Otherwise contact service personnel.

No Daisy Return Branch X [, Box N [,Giver M]]:

Explanation: On the 10 pole ribbon cable that is connected to the yarn sensors, number 5 is for the daisy chain return signal. The QTV bus terminator 75012 in each yarn sensor cable has the responsibility to return this signal when it comes. This error means that the signal is not returned because of hardware problems or interference.

Action: If indication boxes 11331 are used, do the following:
If no box number is displayed, execute COMPLETE TEST under menu SERVICE and look up the new error message. Check that connector to yarn sensor M is completely inserted. Check that the jumper on the indication box N is set on the correct number of used yarn sensor outputs. Check that terminator 75012 is mounted at the end of every yarn sensor cable in box N. Check that cable between yarn sensor M and M-1 is okay. Replace yarn sensor M and also try yarn sensor M-1. If M says yarn sensor 1, try to replace indication box N.
If no indication boxes 11331 are used, do the following:
If no yarn sensor number M is displayed, execute COMPLETE TEST under menu SERVICE and look up the new error message. Check that terminator 75012 is mounted at the end of the yarn sensor cable in branch X. Check that cable between yarn sensor M and M-1 is okay. Replace yarn sensor M and also try yarn sensor M-1.
If that doesn't work and M says yarn sensor 1, try to replace the central control unit. If no yarn sensor number M is displayed, do like in error 'Stop Line Locked' or 'Read line locked'. Otherwise contact service personnel.

Count Error Branch X [, Box N [,Giver M]] :

Explanation: This is an error that only comes when the central control units poweron test or menu command COMPLETE TEST is executed. In both of these tests the central control unit counts number of yarn sensors a few times. This error comes if any of these counts differ from the others. The cause can be bad cables or defect hardware.
Action:, do the following:
Check that cables between yarn sensor M and M-1 and between M and M+1 are okay. Replace yarn sensor M. If M says yarn sensor 1 and indication boxes 11331 are used, try to replace indication box N.
If that doesn't work and M says yarn sensor 1, try to replace the central control unit. If no yarn sensor number M is displayed, do like in error 'Stop Line Locked' or 'Read line locked'. Otherwise contact service personnel.

Unexpected Signal Branch X [, Box N [,Giver M]] :

Explanation: This is an error that only comes when the central control units poweron test or menu command COMPLETE TEST is executed. In both of these tests the central control unit checks that no yarn sensor detect signal, because it shouldn't be possible since the machine is always stopped while testing. The reason for this error can be a yarn moving during the test, vibrations in the creel or a defect yarn sensor.
Action:, see to that no yarn is moving and execute menu command COMPLETE TEST. If the same error comes again, do the following:
Check if the creel vibrates. If so, try to eliminate vibrations or set the yarn sensor sensitivity a little lower. Replace yarn sensors whose LED's are flashing.
If nothing works, contact service personnel.

Early Daisy Return Branch X:

Explanation: On the 10 pole ribbon cable that is connected to the yarn sensors, number 5 is for the daisy chain return signal. The QTV bus terminator 75012 in each yarn sensor cable has the responsibility to return this signal when it comes. This error means that the central control unit didn't expect the signal to come back so soon. It is caused by interference or defect hardware.
Action: Execute COMPLETE TEST under menu SERVICE and look up the new error message. If no error is found the problem is most likely interference. Try to find the source of the interference and eliminate it. If that isn't possible contact service personnel.

Stop Line Locked Branch X [, Box N [,Giver M]] :

Explanation: This is an error that only comes when the central control units poweron test or menu command COMPLETE TEST is executed. In both of these tests the central control unit checks line number 7, called stop line, in the 10 pole ribbon cable for the yarn sensors. This error comes if one of the yarn sensors stop line can't be toggled.

Action: If indication boxes 11331 are used, do the following:
Check under INSTALLATION - SYSTEM VALUES that number of boxes are correct because a value 0 for branch X will cause this error. Remove terminator at the end of the cable connected to the boxes highest used yarn sensor output and measure with a voltmeter between the stop line (pin no 7) and ground (pin no 10). Disconnect the yarn sensors in box X one at a time. When the stop line goes high (15 volts), the defect yarn sensor is found.
If no indication boxes 11331 are used, do the following:
Remove terminator at the end of the yarn sensor cable and measure with a voltmeter between the stop line(pin no 7) and ground (pin no 10). Disconnect the yarn sensors one at a time. When the stop line goes high (15 volts), the defect yarn sensor is found.
If no defect yarn sensor is found, check cables for the yarn sensors or if the stop line is high from the beginning (15 volts), check cables for box N. Then replace indication box N. If that doesn't work and N says box 1, try to replace the central control unit. Otherwise contact service personnel.

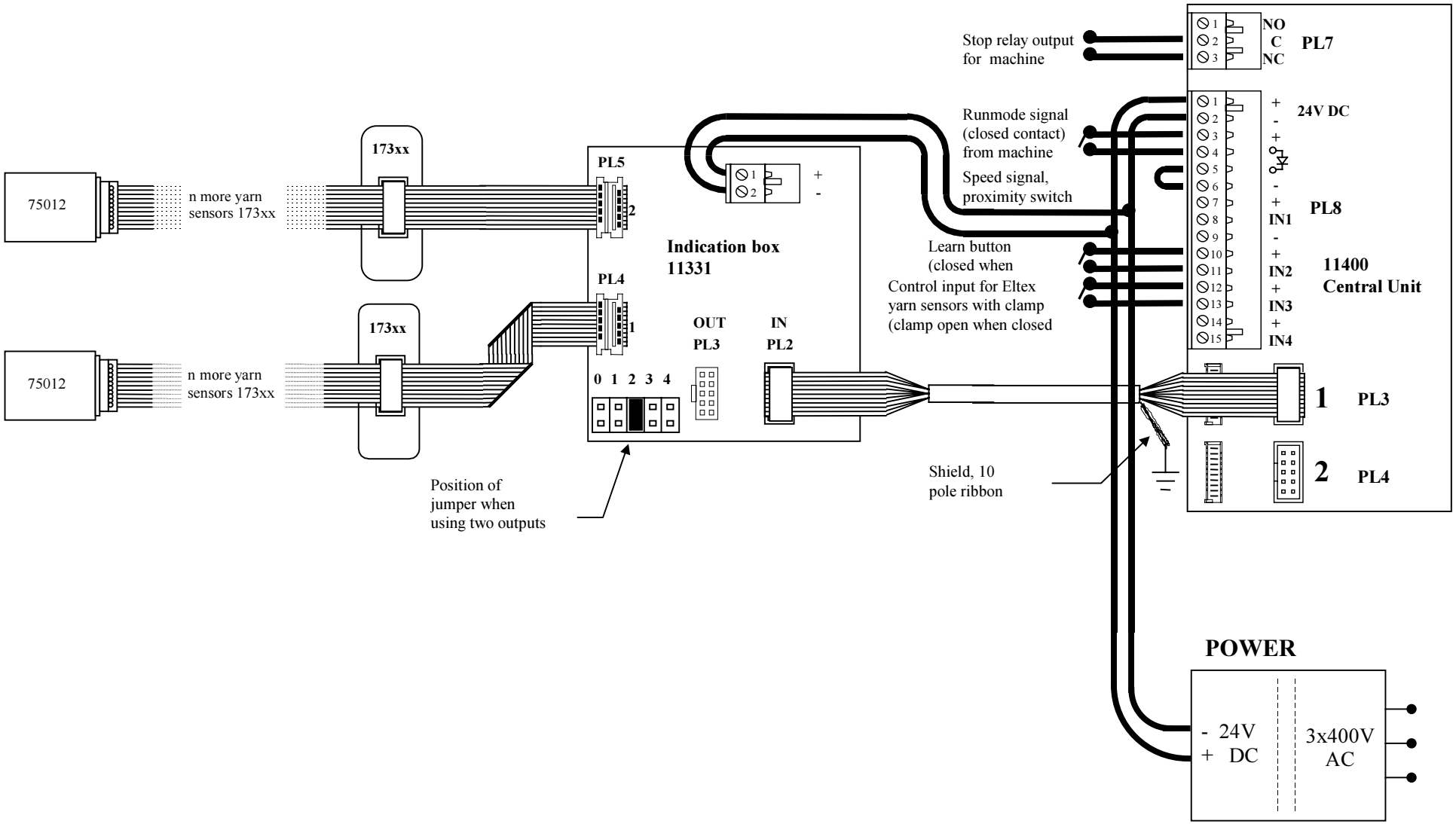
Read Line Locked Branch X, Box N:

Explanation: This is an error that only comes when the central control units poweron test or menu command COMPLETE TEST is executed. In both of these tests the central control unit checks line number 6, called data read, in the 10 pole ribbon cable for the yarn sensors. This error comes if one of the yarn sensors data read line can't be toggled.
Action: If indication boxes 11331 are used, do the following:
Remove terminator at the end of the cable connected to the boxes highest used yarn sensor output and measure with a voltmeter between the data read line (pin no 6) and ground (pin no 10). Disconnect the yarn sensors in box X one at a time. When the data read line goes high (15 volts), the defect yarn sensor is found.
If no indication boxes 11331 are used, do the following:
Remove terminator at the end of the yarn sensor cable and measure with a voltmeter between data read line (pin no 6) and ground (pin no 10). Disconnect the yarn sensors one at a time. When the data read line goes high (15 volts), the defect yarn sensor is found.
If no defect yarn sensor is found, check cables for the yarn sensors or if the data read line is high from the beginning (15 volts), check cables for box N. Then replace indication box N. If that doesn't work and N says box 1, try to replace the central control unit. Otherwise contact service personnel.

EEPROM Defect Branch X:

Explanation: The microprocessor in the central control unit contains a small memory used for storing values for the yarn sensors. This error means that a write to the memory has failed.
Action: Try replacing the central control unit. If that doesn't help contact service personnel.

We reserve the right to modify the design.



Example QTV 11400 connection diagram

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.

Eltex of Sweden is the market leader in the world of electronic
yarn movement detectors and yarn tension monitors for textile machines.
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ELTEX OF SWEDEN AB • BOX 608 • SE-343 24 ELMHULT • TEL +46 476 48800 • FAX +46 476 13400
E-MAIL: public@eltex.se • WEB: www.eltex.se

ELTEX U.S. INC.
P.O. Box 868
Greer, S C 29652-0868
USA
Tel: 864-879-2131
In U.S. toll free
1-800-421-1156
Fax: 864-879-3734
Email: sales@eltexus.com

ELTEX (U.K.) LTD
Lane Close Mills/Bartle Lane
Great Horton
Bradford BD7 4QQ
England
Tel: 01274-57 10 71
Fax: 01274-50 12 09
Email: general@eltex.co.uk

ELTEX MFG LTD
Railway Road
Templemore, Co. Tipperary
Ireland
Tel: 504-314 33
Fax: 504-310 02
Email: public@eltex.ie

ELTEX OF SWEDEN GMBH
c/o Frank Widmann e.K.
Murgstrasse 13
DE-76337 WALDBRONN
Germany
Tel: 07243-767268
Fax: 07243-61216
Email: a.f.widmann@t-online.de

POLSA-ELTEX S.L.
Zamora, 103 - entlo 3
ES-08018 Barcelona
Spain
Tel: 093-309 00 17
Fax: 093-309 59 45
Email: polsa@infonegocio.com

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