# Manual,

# controller for

# Tanco 2020 A

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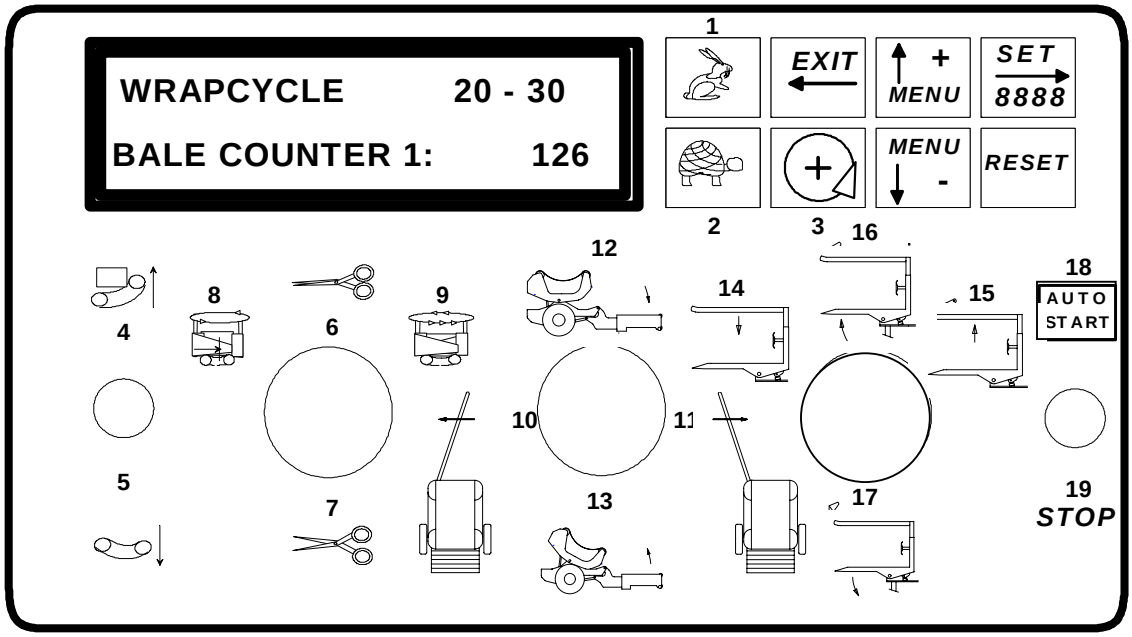
## 2 General description

This manual is divided into three parts. Part 1, describing the facilities used in daily operation by the end – user, part 2 includes a description of the facilities that are used by the manufacturer of the wrap machine to adjust the operation of the program in the controller. The third part of the manual describes the facilities in the controller that allows the manufacturer of the wrap machine in cooperation with the manufacturer of the controller to adjust the settings of the controller to the actual behaviour of the wrap machine and the programmed cycle to be utilised fully automatically.

The controller is strictly designed to be used on the Tanco bale wrapper, 2020 A. Any unauthorised use of the controller and the programs in the controller is not within the responsibility of the manufacturer of the controller.

This manual is applicable for the facilities in the controller with the program version 25, dated 25th April 2001.




1 Wrapping speed incrementation.
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3 Additional film turns.
4 Manual bale offloading
5 Tip table to horizontal position.
6 Film cutter close.
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8 Wrapping-arm positioning
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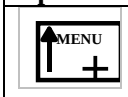
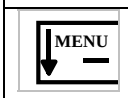
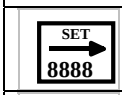
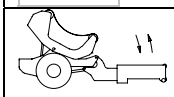
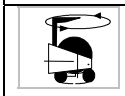
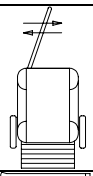
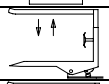
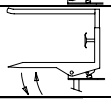
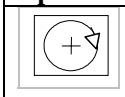
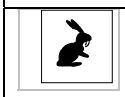
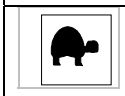
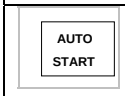
The TANCO wrap control system is developed with the intention of assisting the operator to maintain full control of the machine. The system provides for detailed instruction and messages via the 40 character alphanumeric display, enabling the operator to monitor the operation of the wrap machine at any instant even when trailed behind a baler.

The system is equipped with various test programs, warning messages, error messages and instructions which makes the system superior in terms of facilities, service and operation.

## 3 The display unit and panel functions

| Function pre select | Description |
|---|---|
|   | The menu scroll up/down key. Is used to search for the mode the operator wishes to view. It is also used for incrementing values such as required number of film layers and other machine parameters when in the SET mode. |
|   | The menu scroll up/down key. Is used to search for the mode the operator wishes to view. It is also used for decrementing values such as required number of film layers and other machine parameters when in the SET mode. |
|   | The SET key is used to enter the SET mode and to reset values in for example the bale counters. |
|   | When in " SET " mode, this is used to exit the "SET" mode or to return to a previous programming level. |
|   | Is used to reset or cancel all registered film layers applied to the bale in a cycle. |
|  | Activates the film cut/ hold devices for manual operation. |
|  | Manual load arm up. Activates the LOAD ARM for manual operation. The LOAD ARM function will remain active while the " MAN " manual function switch is activated. |
|  | Manual wrap arm run. The speed will commence in slow speed and then accelerate to maximum. When the manual wrapping is completed the speed will return to slow after which the wrap arm will stop. The wrapping will only remain while the MANUAL is activated. |
|  | Manual wrap arm slow run. The speed will remain slow. The wrapping will remain until the wrapping arms are in normal stop position after the MANUAL SWITCH is deactivated. A one pulse activation on this switch will always cause the wrapping arm to seek next position with a minimum of the defined number of film layers before film release in order to have sufficient time to operate the film cutter devices. |
|  | Hitch IN / OUT manual function. Other functions such as load and off load are accessible provided that the hitch is in the required position defined in the machine program. |
|  | Manual bale squeeze / release function, load cycle. |
|  | Manual elbow in / out 90° function, load cycle. |
|  | Manual bale off loading function. |
|  | Manual table tip to horizontal function. The function is only assessable provided that the hitch, load arm and wrap arm are in their required positions. |

| Function pre select | Description |
|---|---|
|  | Additional film layers. During the machine operation each push on this button will increase the film program number by one layer for the cycle in question. After a completed cycle a push on this switch followed by a AUTO START command will always cause the wrapping cycle to restart an proceed with a with a minimum of revolutions equal to the film release number. If the system has been reset and a bale is positioned on the table but not presented by the **BALE ON SYMBOL** ( 0 ) symbol on the top right hand corer of the display, pressing this button for 6 seconds will call up this symbol and the controller will now recognize that a bale is placed on the machine and the cycle may now be started. |
|  | Wrap speed incrementation. For each activation on this button the wrap speed will be incremented. The maximum speed obtainable is specified in the service level not assessable to the user. The minimum speed is approximately 6 Rpm. The display will show the requested and actual speed when the operator uses the speed increment and decrement buttons. The system will then aim at locking on to that speed. |
|  | Wrap speed decrementation. For each activation on this button the wrap speed will be decrease. The maximum speed obtainable is specified in the service level not assessable to the user. The minimum speed is approximately 12 Rpm. The display will show the requested and actual speed when the operator uses the speed increment and decrement buttons. The system will then aim at locking on to that speed. |
|  | The START switch will initiate the AUTOMATIC cycle. It may also be used to cut the cycle Wrap cycle short. **Example:** The wrapping cycle is set to 30 film layers. The operator wishes to stop the cycle and off load the bale using only the automatic facilities of the system as the machine is positioned behind the Baler and therefore not practically operated in the manual mode. Activating the START switch during an automatic cycle, will cause the controller to consider the bale as completed and the machine will position the wrapping arm when ready. The display will now state that it is ready for off loading. When the wrap arm is positioned<br>a START command will off load the bale. |

## 4 General description of the controller and the operation of the 2020 A

The controller is designed to assist the end - user to operate the wrap machine in fully automatic mode to maximum performance, meaning that the end – user of the wrap machine has to provide a minimum input to the controller in order to operate the machine.

The controller is programmed to be “intelligent”. As a result of this the controller continuously detects the conditions of the hydraulic system and adopts the correct settings for the controller in order to meet the requirements which the user has programmed into the controller. The system will during the first 1 – 2 wrapping cycles after disconnection of the power use the default settings in the controller. This means that optimised operational conditions are achieved after 1 – 2 wrapping cycles where the first 1 – 2 wrapping cycles will appear as slow and not in accordance with the expected behaviour of the machine.

The default settings in the controller is carefully developed by Tanco in order to achieve the optimised operation of the machine and it is strongly recommended to avoid any changes to the values without an agreement with Tanco.

**CAUTION :** Change of the settings in the service level of the controller might in special cases cause damage to the machine.

## 4.1 Modes of operation

The system is designed so that the automatic mode and the manual mode are separated by a STANDBY MODE. This means that when operated in the automatic mode, all manual commands are ignored with the exception of AUTO START, STOP, BALE SQUEEZE, RELEASE, LOAD ARM UP, DOWN, WRAP ARM SPEED ADJUSTMENTS and the application of additional film layers, all other manual functions are only assessable when in standby mode.

### 4.1.1 Standby mode

Standby mode is the waiting state between the Auto and the Manual mode. Standby mode is automatically resumed when :

1. An automatic cycle is completed.

2. Between cycle steps, Example: The wrapping cycle is completed and the system announces that it is ready to off load the bale. ***It is here in STANDBY for a operator command*** for manual or automatic function. A START command will instruct the machine to advance to the next logical step in the auto cycle, namely the off loading of the bale.

3. Stopping the cycle will at any stage bring the system into standby mode.

### 4.1.2 Manual mode

Activating one of the manual function keys accesses the manual mode. When first a manual function switch is activated this function is executed provided that it is a " legal " operation. If the operator requests an illegal function such as off loading a bale while the Wrapping arm and or the hitch, are not in position the system will refuse to perform the operation and state in the display the reason for the refusal, enabling the operator to correct the machine status before the requested function can be made active.

The machine is generally operated automatically. The controlling system will with its standard factory settings, automatically control the machine with START commands. For every program step, the machine has completed, the machine will stop and await further command from the operator. During a normal automatic cycle the machine will via both the audio alarm and display messages, inform the operator that the wrapping cycle has now been completed and write the display message " READY TO OFF LOAD:" At this stage a START command will cause the bale to be off loaded.

# 5 The display menus

The display menus are divided into two major levels.

## 5.1 Operator level

At the operator level there is a number of menus, which enables the operator to perform various tests and adjustments to the machine operation. Should adjustments of parameters, which not are assessable to the operator, be required, please contact the TANCO dealer or TANCO.

The display no. 1 – 44 are all available to the user without any further notice. These displays are all designed to be used during the daily work with the machine. The remaining parts of the displays are all designed to be used for adjustment of physical behaviour of the machine and shall only be used with strict accordance with the instructions given by Tanco or its agent.

## 5.2 Service level

At the service level of the display menu is a number of menus, which enables the service staff and Tanco to perform various tests and adjustments to the machine operation. This level of menus also contain a number of facilities to adjust the physical behaviour of the controller and the machine. This level is only used by the service staff or by the personnel appointed by Tanco to perform optimisation of the machine. The machine is generally optimised from the factory and this level will only be used by very rare occasions.

The headings in the table showing the displays are as follows :

| | |
|---|---|
| Disp. No. | indicates the number of the display, shown for a short period in soft brackets when the display comes up. |
| Level | shows the level of the display in the menu structure. Example : at display no. 6 pressing SET will bring you to level 2, display no. 7 and pressing EXIT at a level 2 display will bring you to the last shown level 1 display.<br><br>In the list of displays are the top level (level 1) at the operator level and the top level (level 2) at the service level of displays shown in bold format. |
| Display indication | the wording in the display, X indicates a figure that is detected by the controller without any possibility of interference from the user. Y indicates figures that can be changed by the user. |
| Def. Value | default value for this display. |
| Description | description of the function of the menu item in the display. |

When "~" is indicated in the display this means the SET – button.

In order to return to normal operational mode at all displays, push the EXIT button for 1 second.

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| **1** | **0** | **TANCO SQUARE WRAPPER VER.:2020A, 24 010325** | | **This display is only shown when the controller is turned on and only shown for a short period of time before the controller automatically switch to display no. 2. The version of program and the date of release is shown.** |
| **2** | **1** | **WRAP CYCLE : 0 – 10 x BALECOUNTER 7: 0** | | **This operative display shows the commonly most needed information. The number 15 indicates the actual number of applied film layers at this instant. The number 10 is the operator programmed film layer requirement. The number 1 is the bale counter in use and the number 324 is the quantity of bales registered in counter num-** |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| | | | | **ber 1.**<br><br>**The "O" (zero) in the top right hand corner means that there is a bale positioned on the table. While "x" means that there is no bale positioned on the table.** |
| **3** | **1** | **Rotate-FWD = Transport**<br>**Rotate-POS. = Backwd.** | | **When this display is shown, the wrap arm reverse function is assessable on the wrap arm positioning switch. (Transport Position)** |
| **4** | **1** | **ACTIVATED:**<br>**NO FUNCTION ACTIVE.** | | **This operative display shows at all times which function the machine operates at present. This feature enables the operator to monitor the stage the machine is at during a cycle. It is also of great assistance should it be necessary to determine which relay outputs should be active for a given function.** |
| **5** | **1** | **ACTUAL RPM XX**<br>**WANTED ( MAX.30) : XX** | **30** | **Actual Rpm is the speed at which the wrap arm is rotating at present. Max. 30 is the maximum speed the system is programmed to accept as input. The XX to the right of the (max. 30) is the operator adjusted speed level which the controller then will try to maintain.** |
| **6** | **1** | **BALE COUNTERS**<br>**Press "~" to enter.** | | **The system contains 10 bale counters which the operator is free to choose from. The individual counters are reset able. When this display is shown, it is possible to inspect the sum of all bale counters. Machine total (the sum of all bales ever made on the machine) and the quantity of each individual bale counter.**<br><br>**(Press SET to go to the next display or press MENU - to advance to next menu at level 1, MENU + to previous at level 1 or EXIT to go operative)** |
| 7 | 2 | BALES TOTAL: XXXXX<br>MACHINE TOTAL: XXXXX | | Bales total. As below but a reset able function. Machine total displays the total quantity of bales made on the machine in total. This is not a reset able function. |
| 8 | 2 | COUNTER: 1:XXXX<br>2:XXXX 3:XXXX | | Each counter display contains 3 counters. |
| 9 | 2 | COUNTER: 4:XXXX<br>5:XXXX 6:XXXX | | Each counter display contains 3 counters. |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| | | | | |
| 10 | 2 | COUNTER: 7:XXXX<br>8:XXXX 9:XXXX | | Each counter display contains 3 counters. |
| **11** | **1** | **SETUP (Tanco 2020 A)**<br>**Press "~" to enter.** | | **This is the operator service level. When in this mode the operator is able to engage / disengage the various sensors. Also variables such as load arm, cutter and tip timer functions may here be set or adjusted.**<br><br>**Press SET to go to the next display or press MENU - to advance to next menu at level 1, MENU + to previous at level 1 or EXIT to go operative.** |
| 12 | 2 | HYDRAULIC FLOW: Y | LOW | The system is equipped with 2 individual timer tables enabling the machine to operate correctly within 2 value sets of minimum and maximum oil flow levels. Example (H) high level could be a flow level causing max. wrapping speed to be within 25 to 30 rpm and (L) low level a speed of 20 to 25 rpm. I order to make the machine work optimal best matching table should be chosen. |
| 13 | 2 | AUTO-LOAD<br>BALE : YY | NO | Enables the operator to choose between auto loading (YES) and manual loading (NO) of the bale. |
| 14 | 2 | GRAB CLOSE DURATION<br>TO GRIP BALE : Y.Y | 2.0 | |
| 15 | 2 | RAISE LOAD ARM ABOVE<br>SENSOR DURATION: Y.Y | 0.1 | |
| 16 | 2 | FILM LAPS BEFORE<br>FILM-RELEASE: Y | 2 | |
| 17 | 2 | FILM-RELEASE DURA-<br>TION (OPEN): Y.Y | 0.4 | |
| 18 | 2 | FILM-RELEASE DURA-<br>TION (CLOSE): Y.Y | 0.0 | |
| 19 | 2 | PULSES, LAST REV. UN-<br>TIL CUTTER OPEN : Y | 5 | |
| 20 | 2 | CUT: CUTTER OPEN<br>DURATION: Y.Y | 2.5 | |
| 21 | 2 | CUT: CUTTER CLOSE | 3.0 | |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| | | DURATION: Y.Y | | |
| 22 | 2 | SENSOR SETUP.<br>PRESS "~" TO ENTER | | Entering the sensor setup. In case of a defect sensor it may be disengaged enabling continuous operation.<br><br>**WARNING!** All sensors installed on the machine, should under all normal circumstances be engaged. The sensor engage / disengage facility is only intended as an aid for the operator in case of a defect sensor as provides for access to operate manually the machine in those steps where a sensor is defect provided it has been disengaged.<br><br>Press SET to go to the next display or press MENU - to advance to next menu at level 2, MENU + to previous display at level 2 or EXIT for one second to go operative |
| 23 | 3 | TABLE IS HORIZONTAL<br>SENSOR INSTALLED: Y | YES | Governs the correct position of the table when loading, wrapping and off loading and monitors if wrap arm and load arm activation is legal. |
| 24 | 3 | HITCH-SENSOR INSTEAD<br>OF INFRARED-REC.: Y | YES | |
| 25 | 3 | MULTI PULSE ROTATION<br>SENSOR INSTALLED: Y | YES | Wrap-arm speed reference sensor. Monitors the speed of the wrapping arm and determines the point of speed reduction and cutter activation during the beginning and the end of a cycle. Determines the position where the cutters are to be operated and controls the speed of the machine. |
| 26 | 3 | ROTATION SENSOR (1 P.<br>/REV ) INSTALLED: Y | YES | Monitors the number of film layers applied to the bale and functions as reference point for the wrapping-arm. Determines the stop / parking position of the wrap arm. |
| 27 | 3 | LOAD ARM ALMOST DOWN<br>SENSOR INSTALLED: Y | YES | The load arm sensor determines when the table is permitted to return to the horizontal position.<br><br>Upon this signal the system is informed that the load arm is clear from the wrap arm and the wrap cycle is now allowed to commence. |
| 28 | 3 | LOAD-ARM-IN 90°<br>SENSOR INSTALLED: Y | YES | |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| 29 | 3 | LOAD-ARM-OUT 90°<br>SENSOR INSTALLED: Y | YES | |
| 30 | 3 | FALLDAMPER SENSOR<br>INSTALLED: Y<br>(Bale Ramp) | YES | Press EXIT to go to display no. 22 and press MENU - to advance to display no. 31 or EXIT for one second to go operative |
| **31** | **1** | **HARDWARE TEST**<br>**Press "~" to enter.** | | **The hardware test program is a tool facility enabling and guides the operator and service people to test and inspect almost all functions, switches and push buttons on the system.**<br><br>**It also contains a battery supply voltmeter which automatically will be displayed should the voltage drop below 8 volt during the operation.**<br><br>**(Press SET to go to the next display or press MENU + to previous at level 1 or EXIT to go operative)** |
| 32 | 2 | SUPPLY VOLTAGE: xx.xV<br>LAST DROP: xx.xV | | Displays the instantaneous battery supply loaded and off load. The last drop is the lowest voltage supply measured during current surge when activating the hydraulics.<br><br>Is currently monitoring the battery supply voltage from the tractor battery. The voltmeter will simultaneously display :<br><br>A. The instantaneous battery voltage (off load, inactive hydraulics and on load, active hydraulics.)<br>B. The most resent voltage drop caused by activating the hydraulics.<br>C. The display will in case of a sudden voltage drop below 8 volt, show the value of the supply at this instant and simultaneously sound the audio alarm. |
| 33 | 2 | TEST SENSORS<br>Press "~" to enter. | | Entering the sensor / input test facility for testing sensors and inputs.<br><br>Enables the testing of each signal input on the controller and each sensor.<br><br>PRESS SET TO ENTER (or press MENU - to advance to next menu , MENU + to previous or EXIT for 1 second to go operative) |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| | | | | |
| 34 | 3 | LOADARM UP, NO. 0 : 0 | | A 0 ( zero ) statement means that the sensor is inactive and a 1 ( one ) statement that the sensor is active. The sensor number corresponds with the terminal number. ( A 0 status for the infrared receiver, means that it is either not installed, momentarily receiving or defect.) |
| 35 | 3 | TABLE HORIZ.NO.1:0<br>IR/HITCH NO.2:0 | | As for display 34 |
| 36 | 3 | ROTA. MULTI No. 3:0<br>ROTATION 1 P., No. 4:0 | | As for display 34 |
| 37 | 3 | LOAD ARM DOWN.5:0<br>LOADARM 90° IN.6:0 | | As for display 34 |
| 38 | 3 | LOADARM 90° OUT, NO 7:0<br>FALLDAMPER, NO. 8:0 | | As for display 34 |
| 39 | 3 | TEST COUNTED PULSES,<br>THIS BALE: 0 (0) | | Press EXIT to go to display no. 33 and press MENU - to advance to display no. 40 or EXIT for one second to go operative |
| 40 | 2 | TEST KEYS PRESSED:<br>XXXX.XXXX | | Enables the testing of each push button on the control panel. |
| 41 | 2 | TEST SWITCHES ACTIVE:<br>XX.XXXX.XXXX.XXXX.XX | | Enables the testing of each function switch on the control panel.<br><br>Please refer to separate table showing the display during testing the switches. |
| 42 | 2 | TEST RELAYS, 0=OFF<br>XXXXXXXXXXXX -14 | | Enables the testing of each relay output function for the hydraulics on the controller |
| 43 | 2 | PWM % ( X.XX ) : X.XX<br>ACTUAL RPM.: XX | | Enables the testing of the entire modulation spectrum of the valve. I.e. to find the point at which the proportional valve provides sufficient oil to an activated function. To access this direct valve control, press the SET button and use the MENU? /- button to increment and or decrement the modulation value. |
| 44 | 2 | TEST. IR REMOTE CONTROL: XX.XX.XX.XX | | Press EXIT to go to display no. 31 or EXIT for one second to go operative. |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| | | | | |
| | | **END OF USER OPERATED SECTION** | | |
| 45 | | Not used | | |
| 46 | | Not used | | |
| 47 | | Not used | | |
| 48 | | Not used | | |
| 49 | | Not used | | |
| **50** | **2** | **SERVICE CODE: YYY** | **000** | **The display must be showing display no. 2 in order to gain access to the service level of the controller.**<br><br>**This is a secret entry code for the service level. Should not be available to the user.**<br><br>**Contact your dealer.** |
| 51 | | Not used | | |
| 52 | | Not used | | |
| 53 | | Not used | | |
| **54** | **2** | **VELCOME TO SETUP** | | **Entering the setup main menu.** |
| **55** | **2** | **LANGUAGE:** | **Eng-lish** | **The system may contain a number of different languages for display messages. For this version of the program is only English included.** |
| **56** | **2** | **TYPE: 2020 A**<br>**120. Square bale wrap** | **Tanco 2020 A** | **Setting up the machine model. In order to load default values it is required to push the set button followed by exit. For this version of software is only 2020 A available.**<br><br>**press MENU + to go to previous display or EXIT for one second to go operative.** |
| 57 | | Not used | | |
| **58** | **2** | **HYDRAULIC FLOW: Y** | **L** | **The system is equipped with 2 individual timer tables enabling the machine to operate correctly within 2 value sets of minimum and maximum** |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| | | | | **oil flow levels. Example (H) high level could be a flow level causing max. wrapping speed to be within 25 to 30 rpm and (L) low level a speed of 20 to 25 rpm. I order to make the machine work optimal best matching table should be chosen.** |
| **59** | **2** | **WORKING HRS.:XXXXX.X<br>MACHINE TOT.:XXXXX.X** | | **Working hours, is a timer counter which may be used by the operator to inspect the amount of active wrapping time performed in i.e. one day. This counter may be zeroed.<br><br>Machine total is a counter which registers the total amount of hours the machine has been working. The counter cannot be reset. Both counters are active when hydraulic power is applied.** |
| **60** | **2** | **AUDIO & DISPLAY.<br>Press "~" to enter.** | | **When the display shows this message, the audio alarm may be switched on/off and the display contrast may be varied. The display contrast is though always adjustable directly on the menu up and down buttons.** |
| 61 | 3 | AUDIO ALARM : | ON | Select that the audio alarm is ON or OFF. |
| 62 | 3 | DISPLAY CONTRAST : YY | 10 | Set the contrast of the display. |
| 63 | 3 | DISPLAY LIGHT : Y | ON | Select that the light in the display is ON or OFF.<br><br>Press EXIT to go to display no. 60 or EXIT for one second to go operative. |
| **64** | **2** | **SENSOR SETUP<br>PRESS "~" TO ENTER** | | **As for display 22.<br><br>Press MENU - to advance to next menu , MENU + to previous or EXIT for one second to go operative.** |
| 65 | 3 | TABLE IS HORIZONTAL SENSOR INSTALLED: Y | YES | As for display 23. |
| 66 | 3 | HITCH-SENSOR INSTEAD OF INFRARED-REC.: Y | YES | As for display 24. |
| 67 | 3 | MULTI PULSE ROTATION SENSOR INSTALLED: Y | YES | As for display 25. |
| 68 | 3 | MULTI PULSE ROTATION SENSOR PULSES/REV: Y | 12 | Number of pulses for one revolution. |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| | | | | |
| 69 | 3 | ROTATION SENSOR (1 P. /REV ) INSTALLED: Y | YES | As for display 26. |
| 70 | 3 | LOAD ARM ALMOST DOWN SENSOR INSTALLED: Y | YES | As for display 27. |
| 71 | 3 | LOAD ARM IN 90° SENSOR INSTALLED: Y | YES | As for display 28. |
| 72 | 3 | LOAD ARM OUT 90° SENSOR INSTALLED: Y | YES | As for display 29. |
| 73 | 3 | FALLDAMPER SENSOR INSTALLED: Y | YES | As for display 30.<br><br>Press EXIT to go to display no. 64, MENU + to previous or EXIT for one second to go operative. |
| **74** | **2** | **SEQUENCE-SETUP PRESS "~" TO ENTER** | | **Entering sequence setup.**<br><br>**The below parameters are displayed in the cycle sequence exactly as the machine performs the operations.** |
| 75 | 3 | WARNING BEACON TIME BEFORE START: Y.Y | 0.0 | The amount of time the warning beacon is active before the hydraulic circuits becomes activated. |
| 76 | 3 | AUTO LOAD BALE : Y | NO | A YES statement will when a bale is located on the load arm with the load arm in the standby position upon a AUTO start command cause the bale to be loaded onto the table and start the wrap cycle. |
| 77 | 3 | GRAB CLOSE DURATION TO GRIP BALE: Y.Y | 2.0 | The length of time which the grab hydraulics is active during the grab bale sequence. ( in an auto cycle.) |
| 78 | 3 | LOADING ARM 90° IN DURATION: Y.Y | 1.0 | The length of time which the grab hydraulics is active during the lift grab sequence. ( in an auto cycle.) |
| 79 | 3 | RAISE LOAD ARM ABOVE SENSOR DURATION: Y.Y | 0.1 | The amount of time the load arm hydraulics is to active in the upwards movement during loading. The time is counted from the release of the load arm sensor. |
| 80 | 3 | GRAB OPEN DURATION, RELEASE BALE: Y.Y | 1.2 | The amount of time the grape hydraulics is to active when positioning the bale on the turn table. ( in an auto cycle.) |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| 81 | 3 | LOAD ARM UP TO DOWN DELAY: Y.Y | 0.4 | When the load arm is raised, it will in an automatic loading cycle pause for the specified period before returning to standby position ( sensor level ) |
| 82 | 3 | LOAD ARM 90° OUT DURATION: Y.Y | 1.0 | The time which the load arm hydraulics is active when lowering (in an auto cycle.) |
| 83 | 3 | LOWER LOAD ARM BELOW SENSOR DURATION: Y | 0.3 | The amount of time the grape hydraulics is active when bringing the grape to pickup position. ( in an auto cycle.) |
| 84 | 3 | WAIT FOR START SIGNAL AFTER LOAD: Y | NO | A NO statement will here cause the machine to commence the wrap cycle automatically when the bale is positioned on the turn table and the load arm has returned to the standby position. |
| 85 | 3 | WRAP START, SKIP PUL-SE DURATION: Y.Y | 0.8 | This variable eliminates the possibility of false im-pulse counting during the turntable start at the be-ginning of a cycle. |
| 86 | 3 | ROTATE MULTI PULSES INTERVAL MAX.: Y.Y | 10.0 | The maximum amount of time allowed without missing rotate pulses, before the system will stop and announce an error. |
| 87 | 3 | MAX DURATION, ROTATE 1 REVOLUTION: Y.Y | 15.0 | The maximum time allowed between rotate refer-ence rotate pulses, before the system will stop and announce an error. |
| 88 | | Not used | | |
| 89 | 3 | FILM LAPS BEFORE FILM RELEASE (s): Y | 2 | This value determines the quantity of film layers required on the bale before the film holders releases the film. |
| 90 | 3 | FILM RELEASE DURATION ( OPEN): Y.Y | 0.4 | The time which the hydraulics is active in order to release the film. |
| 91 | 3 | FILM RELEASE DURATION (CLOSE): Y.Y | 0.0 | The time which the hydraulics is active when clos-ing the cutters after the film release. |
| 92 | 3 | PULSES,LAST REV UNTIL DECELERATE: Y | 1 | Determines the point where the wrapping arms must begin to reduce the speed. |
| 93 | 3 | PULSES LAST REV UNTIL CUTTER OPEN: Y | 5 | Determines the point where the film cutter action is to take place. |
| 94 | 3 | CUT: CUTTER OPEN DURATION: Y.Y | 2.5 | The time which the cutter open hydraulics is active in order to catch the film properly. |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| 95 | 3 | CUT:CUTTER CLOSE DURATION : Y.Y | 3.0 | The time which the hydraulics is active when closing the cutters for film cut and hold. |
| 96 | 3 | WAIT FOR START SIGNAL BEFORE TIP: Y | NO | If the answer is NO, the system will automatically off load the bale when the cycle is complete. A YES means that the system awaits an operator START command for the off loading. |
| 97 | 3 | OFF LOAD: TIP BACKWD. DURATION: Y.Y | 0.5 | The time where the hydraulics is active when off loading the bale. |
| 98 | 3 | DELAY, TABLE TIP BACKWD. TO FORWD: Y.Y | 0.1 | The time which the hydraulics is paused from off load position before the return to loading position. |
| 99 | 3 | TABLE TIP FORWD. AFTER SENSOR DUR.: Y.Y | 2.0 | The time which the hydraulics is active when passing the table horizontal sensor.<br><br>Press EXIT to go to display no. 74, MENU + to previous or EXIT for one second to go operative. |
| **100** | **2** | **PROPORTIONAL VALVE SPEED SETUP. PRESS "~" TO ENTER.** | | ***( or press MENU - to advance to next menu , MENU + to previous or EXIT to go operative)*** |
| 101 | 3 | VALVE START TO OPEN (RPM. STILL=0) PWM%: YY | 35 | The valve position where the duty cycle exactly causes the valve to provide sufficient oil to make the wrap arm move in cold conditions of the hydraulics. |
| 102 | 3 | VALVE MAX OPEN PWM% (GIVING MAX RPM): YY | 60 | The duty cycle which produces the valve position which gives the max. required oil flow. |
| 103 | 3 | VALVE MAX OPEN DURING START PWM %: YY | 44 | The maximum allowable PWM % during start of the cycles. |
| 104 | 3 | PWM FREQUENCY: YYY | 230 | The frequency at which the valve is specified to operate at. Refer to valve manufactures specification sheets. |
| 105 | 3 | SUPPLY VOLTAGE MAY INFLUENCE PWM : YY % | 90% | Voltage / PWM adjustment factor. 90 to 100 % variation capacity is recommended. |
| 106 | 3 | PWM % ( X.XX : X.XX ) ACTUAL RPM. | | Enables the testing of the entire modulation spectrum of the valve. I.e. to find the point at which the proportional valve provides sufficient oil to an activated function. To access this direct valve control, press the SET button and use the MENU? /- button to increment and or decrement the modulation value. |

| Disp. no. | Level | Display indication | Def. value | Description |
|---|---|---|---|---|
| | | | | |
| 107 | 3 | SLOW WRAPPING SPEED RPM: Y | 8 | Minimum desired wrap arm speed<br>It is not possible for the operator to reduce the speed further below this value |
| 108 | 3 | MAX. WRAPPING SPEED,RPM.: YY | 30 | Maximum desired wrap arm speed. It is not possible for the operator to increase the speed further below this value |
| 109 | 3 | STANDARD WRAPPING SPEED.RPM.: YY | 29 | The speed which the wrap arm will assume as the typical speed. The operator can via the control panel increase and or decrease the speed between maximum and minimum. |
| 110 | 3 | ROTATION ADDITATION SPEED (1=SLOW TO 9) : Y | 1 | The time interval which the controller is to store speed data in memory. This time value will depend on the amount of impulses received from the speed sensor. |
| 111 | 3 | SPEED BALE OFFLOAD (1 – 100): YY | 80 | Press EXIT to go to display no. 100, MENU + to previous or EXIT for one second to go operative. |
| **112** | **2** | **PROP.VALVE ACC./DECELERATION SETUP** | | ***or press MENU + to previous menu or EXIT to go operative*** |
| 113 | 3 | WRAP, ROTATE ACCELERATION DURATION : Y.Y | 3.0 | |
| 114 | 3 | WRAP, ROTATE DECELERATE DURATION : Y.Y | 1.0 | |
| 115 | 3 | WRAP, ROTATE DEC. ACC. CUT DURATION: Y.Y | 1.0 | |
| 116 | 3 | BALE OFFLOAD ACCELERATE DURATION: Y.Y | 1.0 | Press EXIT to go to display no. 112, MENU + to previous or EXIT for one second to go operative. |

## 6 Setting up the system

All functions are pre adjusted from the TANCO factory and commonly the only adjustments, which the operator needs to make, is the programmed number of film layers required or the wrap speed adjustments when required.

## 7 Examples and typical operator programming

A bale has been wrapped in the manual mode. The operator stops the wrapping cycle with the wrap arm positioned away from the wrap arm sensor. If an off load command then is given, the system will via the display announce that this is an illegal command, writing **"WRAP ARM NOT IN POSITION."**

In order to bring the machine into the correct status the operator must then give the system a wrap arm position command on the **MANUAL POSITIONING SWITCH** which will make the wrap arm seek the parking position (off loading position.)

Similarly if a manual wrap cycle is requested and the table is not horizontally positioned, the system will not permit this operation and therefore state the reason for the refusal in the display.

### 7.1 Typical operator programming

1: Required number of film layers. (changing from 20 to 25 layers. )
2: Bale counter selection.

| Disp. No. | Display indication | Push button operations | Description |
|---|---|---|---|
| | **WRAP CYCLE 0 : 20**<br>**BALES : 1 324** | SET 8888 | To enter programming mode, push and hold this button for 1 second. The highest value in the program number will now flash, meaning that it may now be changed. As the number is to be changed from 20 to 25 layers the number 2 is not required changed therefore push the " SET" again to make the lowest number value "0" changeable. |
| | **WRAP CYCLE 0 : 20**<br>**BALES : 1 324** | SET 8888 | The lowest value number will now flash, meaning that it may now be changed. Now use the MENU buttons to increase or decrease the value. |
| | **WRAP CYCLE 0 : 25**<br>**BALES : 1 324** | MENU + | Pushing MENU UP will increment the number between 0 and 9. Similarly MENU DOWN will decrement the number between 9 and 0. In this case push MENU UP 5 times to change the number from 0 to 5. |
| | **WRAP CYCLE 0 : 25**<br>**BALES : 1 324** | EXIT | To exit programmation of required film layers push the EXIT button. The bale counter number (in this case counter number 1) will then flash and the counter number is now changeable. The unit contains 9 individual counters and 1 counter for the sum of bales. The MENU UP or DOWN key is used to change the number. If the same counter is to be used push EXIT again. |
| | **WRAP CYCLE 0 : 25**<br>**BALES : 2 125** | EXIT | It is shown that the counter chosen is counter number 2. This counter contains a quantity of 125 bales, stored in the memory. If it is required to continue the count from this quantity and onwards, push EXIT to return to operative mode, or ZERO the counter on the MENU up or DOWN |

| | | | |
|---|---|---|---|
| | | | key and then EXIT to return to operative. |

## 7.2 A typical wrap cycle

When a bale is off loaded from the wrapper, on the display the controller will state that it now is ready for reloading a new bale and the audio alarm will sound in order to attract the operator attention so that he knows that the machine is ready for the next working sequence.

1: With the load arm in the horizontal position and the grape opened, the machine is brought to the bale. The grape is closed manually using the joystick.

2: The Load arm is raised manually and stops in the standby position.

3: The Elbow may now be raised manually using the joystick, provided that the table is free, the load arm will be allowed to load that bale onto the table. If not free, the load arm will remain in the " standby position" Lifting the load arm above the" standby position" will only be permitted if no bale is located on the table, is off loaded.

4: Upon an Auto start command, the wrapping cycle will now commence, starting in slow speed and gradually increase until the programmed speed level is reached and complete the cycle according to the program. The speed will reduce when the programmed number of film turns is reached, minus one (n-1) and stop with the wrap arm in the parked position waiting for an off load command from the operator.

5: Now that the wrapping cycle is completed the machine will standby for an off load command from the operator on the Auto start switch.

6: The Controller display will now state that the bale is ready for off loading and the audio alarm will sound in order to attract the operator attention. The auto start command is given, the table now tips up in to off load the bale and thereafter return to horizontal position.

7: Cycle restart.

NOTE! Auto load and Auto off load and Auto wrap start may also be used, which reduces the operation to the cycle start.

## 7.3 Interupted cycles

A cycle, which has been interrupted, may at any instant be restarted. The system memorizes the last step in a cycle sequence even when the cycle is a combination of automatic and manually operated functions.

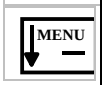
The system program will assure that no illegal functions are being conducted.

## 7.4 Proportional valve adjustment

When adjusting the proportional valve to operate within the required minimum and maximum limits, the most simple method is to enter the hardware testing program.

**Warning :** The change of the minimum PWM shall be done with the machine and the hydraulics in cold conditions as the minimum value for the PWM in hot conditions can be considerable higher than the PWM

for cold conditions. If the value from hot conditions is used this can cause the machine to be operating with much to high values in cold conditions.

| Disp. No. | Display indication | Push button operations | Description |
|---|---|---|---|
| 31 | HARDWARE TEST<br>Press "~" to enter. |  <br>  | To enter HARDWARE TEST press SET followed by MENU – several times until the next display is shown.<br><br>The purpose of this is to determine the minimum and maximum PWM values for the adjustment of the speed of the wrapping arm. |
| 43 | PWM % ( X.XX ) : X.XX<br>ACTUAL RPM.: XX |  | Enables the testing of the entire modulation spectrum of the valve. I.e. to find the point at which the proportional valve provides sufficient oil to an activated function. To access this direct valve control, press the SET button and use the MENU+ / - button to increment and or decrement the modulation value. |
| 43 | PWM % ( X.XX ) : X.XX<br>ACTUAL RPM.: XX |  | Press SET to gain access, for setting the PWM value, the value to the right in the display is flashing. |
| 43 | PWM % ( **36.4** ) : **38.5**<br>ACTUAL RPM.: **XX** |  | Engage the hydraulics.<br><br>Now activate the MANUAL WRAP JOYSTICK and press the MENU+ button until the point where the wrap arm is just turning. The valve opening position is then shown on the display together with the speed of the wrap arm. Record this value as this is to be entered into the service level proportional valve speed setup.<br><br>Important! note that this opening point must provide a wrapping speed which is higher than the minimum time between the speed impulses defined in the service level, otherwise the machine will stop and declare a fault on the following display.<br><br>Now that the opening point is recorded, the max. allowable opening position is to be obtained.<br><br>This value can be entered in display no. 101. |
| 86 | ROTATE MULTI PULSES<br>INTERVAL MAX.: Y.Y | | |
| 43 | PWM % ( X.XX ) : **85.0**<br>ACTUAL RPM.: **30** |  | Now activate the MANUAL WRAP JOYSTICK and press the MENU+ button until the point where the wrap arm is rotating with the maximum allowable speed. The valve opening position is then shown on the display together with the speed of the wrap arm. Record this value as this is to be |

| Disp. No. | Display indication | Push button opera-tions | Description |
|---|---|---|---|
| | | | entered into the service level proportional valve speed setup.<br><br>Now go to the service level setup and enter the two recorded values in the below shown displays.<br><br>The other associated values, minimum speed and maximum speed may be entered as required. Note that now the system should not allow the valve to open further than the point where the max. speed is obtained.<br><br>This value can be entered in display no. 102. |

## 7.5 ERROR MESSAGES ON THE DISPLAY.

The machine monitors via the sensors the status of every individual moving part of the machine. Should the expected position or status of a sensor or device not comply with the safety requirements specified in the software, then the system will stop the machine cycle at the point where an error has occurred or if the operator requests an illegal or hazardous command. It will then on the display state the operational error.

| ERROR MESSAGE. | EXPLANATION. |
|---|---|
| NO CONNECTION | When the communication between the monitor and the controller is absent. Check the connector pins in the 4 pole phone plug and the terminals on the motherboard. |
| VOLTAGE DROP TO:xx.Xv | The load provided by the hydraulic circuit has caused the battery voltage to drop to a level below the acceptable limit. ( 8 volt.)<br><br>1. The tractor generator may be defect.<br>2. The tractor engine Rpm may be too low for the generator to charge the battery.<br>3. The supply cable termination onto the battery may be poor or dirty.<br><br>Check termination and go to the hardware test program to inspect the battery supply voltage in unloaded condition and loaded condition. |
| TABLE TILT TIME-OUT! | Indicates that the table tilt hydraulic function has not been activated on the controller command. A time-out message means that an associated sensor has not received an expected signal within a preset period.<br><br>1. The valve may be defect or hanging.<br>2. The relay output may be defect.<br>3. The Hydraulic connector may have fallen off.<br>4. The cable may be broken.<br>5. The hydraulic connector may be defect.<br><br>Test that the output supply is available on the associated relay terminals, and hydraulic connector. |

| ERROR MESSAGE. | EXPLANATION. |
|---|---|
| | |
| LOAD ARM TIME-OUT ! | As above. |
| WRAP ARM NOT IN POS. | As above. Or may also be required moved manually if positioned in parking position. |
| NO MULTI PULSE ! | As above. |
| LOAD ARM NOT IN POS. | As above. |
| TABLE NOT HORI-ZONT. | As above. |
| | OTHER SIMILAR MESSAGES MAY OCCUR. |

## 8 Trouble shooting using the hardware test program

Press the **MENU - button** until the display shows **HARDWARE TEST**. Press now the SET button to gain access and again press the **MENU- button** until the display shows the required test program.

The system **HARDWARE TEST PROGRAM** is an operator accessible test program, which is intended as a self-help assistance facility. Combined with the display messages, it makes trouble shooting a less complicated matter. It contains the following:

### 8.1 Build in voltmeter

The build in volt meter in display no. 32 is currently monitoring the battery supply voltage from the tractor battery. The voltmeter will simultaneously display :

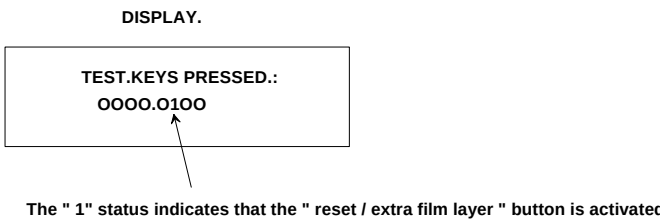
A. The instantaneous battery voltage (off load, inactive hydraulics and on load, active hydraulics.)
B. The most resent voltage drop caused by activating the hydraulics.
C. The display will in case of a sudden voltage drop below 8 volt, show the value of the supply at this instant and simultaneously sound the audio alarm.

### 8.2 Sensor status

This program enables the operator to test if the system reads the individual sensors. An inactive sensor will produce a **"0"** indication where an active sensor will produce a "1" statement. Thus if it is required to test e.g. the machine tilt sensor then use the **MENU buttons** to find the display which covers the sensor and then perform the manual operation or activate the sensor with a magnet. The status change will then be shown as a **0 to 1** status change.

### 8.3 Testing the control panel push buttons

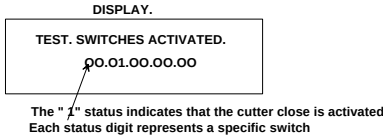
When the display shown below is shown, an activation of the function select buttons will cause the display to write which function select button is pushed. The menu and programming buttons maintains their original purpose and the only button which will show a status change is the " reset / extra film layer button".




## 8.4 Testing the operation switches

When the display no. 41 (TEST. SWITCHES ACTIVE) is shown, an activation of the individual manual operation switches and Start switch will cause the display to write the status change of the manual operation switch.

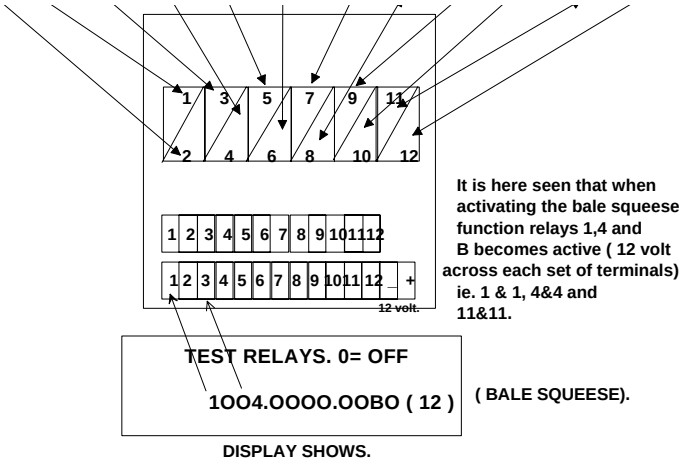
| Pos. | Functions activated on control panel | Display shows activated switch |
|---|---|---|
| 1 | Auto start | 00.0000.0000.0000.01 |
| 2 | Stop | 00.0000.0000.0000.10 |
| 3 | Bale release | 00.0000.0000.0001.00 |
| 4 | Bale grap | 00.0000.0000.0010.00 |
| 5 | load arm in | 00.0000.0000.0100.00 |
| 6 | load arm out | 00.0000.0000.1000.00 |
| 7 | | 00.0000.0001.0000.00 |
| 8 | Tip table to horizontal position | 00.0000.0010.0000.00 |
| 9 | Load arm up | 00.0000.0100.0000.00 |
| 10 | Load arm down | 00.0000.1000.0000.00 |
| 11 | Rotate forwards | 00.0001.0000.0000.00 |
| 12 | Find position | 00.0010.0000.0000.00 |
| 13 | Cutter open | 00.0100.0000.0000.00 |
| 14 | Cutter close | 00.1000.0000.0000.00 |
| 15 | Manual bale offloading | 01.0000.0000.0000.00 |
| 16 | Tip table to horizontal position | 10.0000.0000.0000.00 |




## 8.5 Relay output status

Indicates which hydraulic valves should be active when any operation is commanded. The operator / service man, is then from this information able to determine whether the output signal to a valve is missing or if a valve is ceased or defect. The status of the output is shown as the terminal number.

| Relay no | Relay no | Relay no | Relay no | Relay no | Relay no | Relay no | Relay no | Relay no | Relay no | Relay no | Relay no |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 rotor lamp | 2 fwd. rev. | 3 func. fwd. | 4 func. rev. | 5 wrap for-ward | 6 wrap re-verse | 7 Cut-ter | 8 table tip | 9 Load arm | 10 el-bow | 11 bale re-lease | 12 film mast |




| Pos. | Functions activated on control panel | Display shows activated terminals/outputs. (Terminal 1234.5678.9abc) |
|---|---|---|
| 1 | Elbow down | (terminal 1004.0000.0A00) |
| 2 | Elbow up | (terminal 1030.0000.0A00) |
| 3 | Grab bale | (terminal 1004.0000.00B0) |
| 4 | Release bale | (terminal 1030.0000.00B0) |
| 5 | load arm down | (terminal 1004.0000.9000) |
| 6 | load arm up | (terminal 1030.0000.9000) |
| 7 | Wrap-arm forward | (terminal 1200.5000.0000) |
| 8 | Wrap-arm reverse | Not displayed. |
| 9 | cutter close | (terminal 1030.0070.0000) |
| 10 | cutter open | (terminal 1004.0070.0000) |
| 11 | Tower in | (terminal 1030.0000.000C) |
| 12 | Tower out | (terminal 1004.0000.000C) |
| 13 | tip up | (terminal 1030.0008.0000) |
| 14 | tip down | (terminal 1004.0008.0000) |

### 8.6 Testing the individual relays

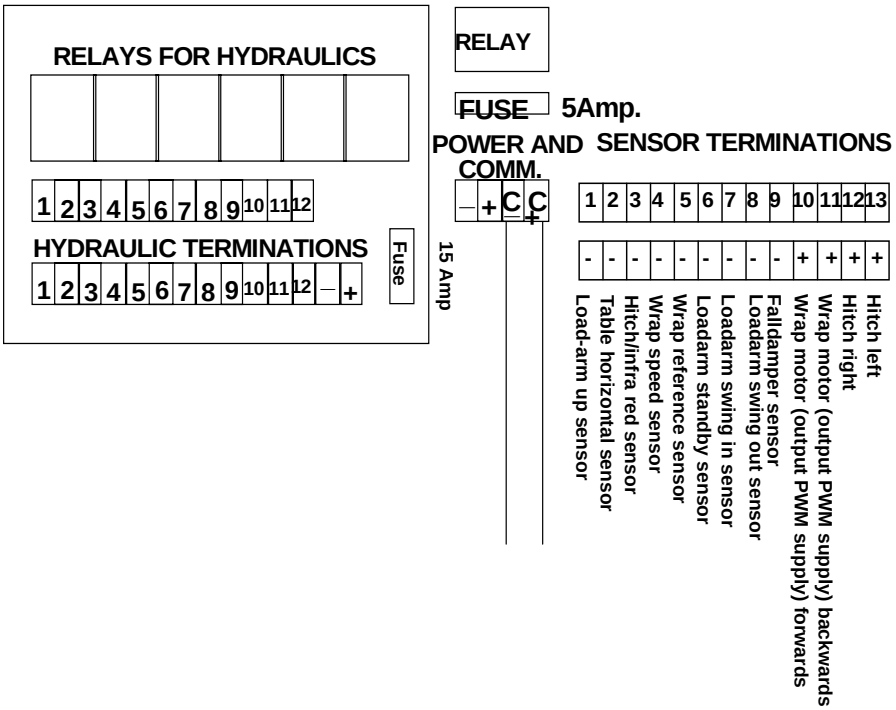
When in the relay hardware test, then to activate the individual relay test, press the **SET button** for 2 seconds to gain access. Press **MENU** to activate the first relay and press **MENU** again to deactivate the relay.

To gain access to the testing of the next relay, press **SET button** again, the display will now flash the relay number which now may be activated., activate the relay on the **MENU button** and deactivate on the **MENU button** again.

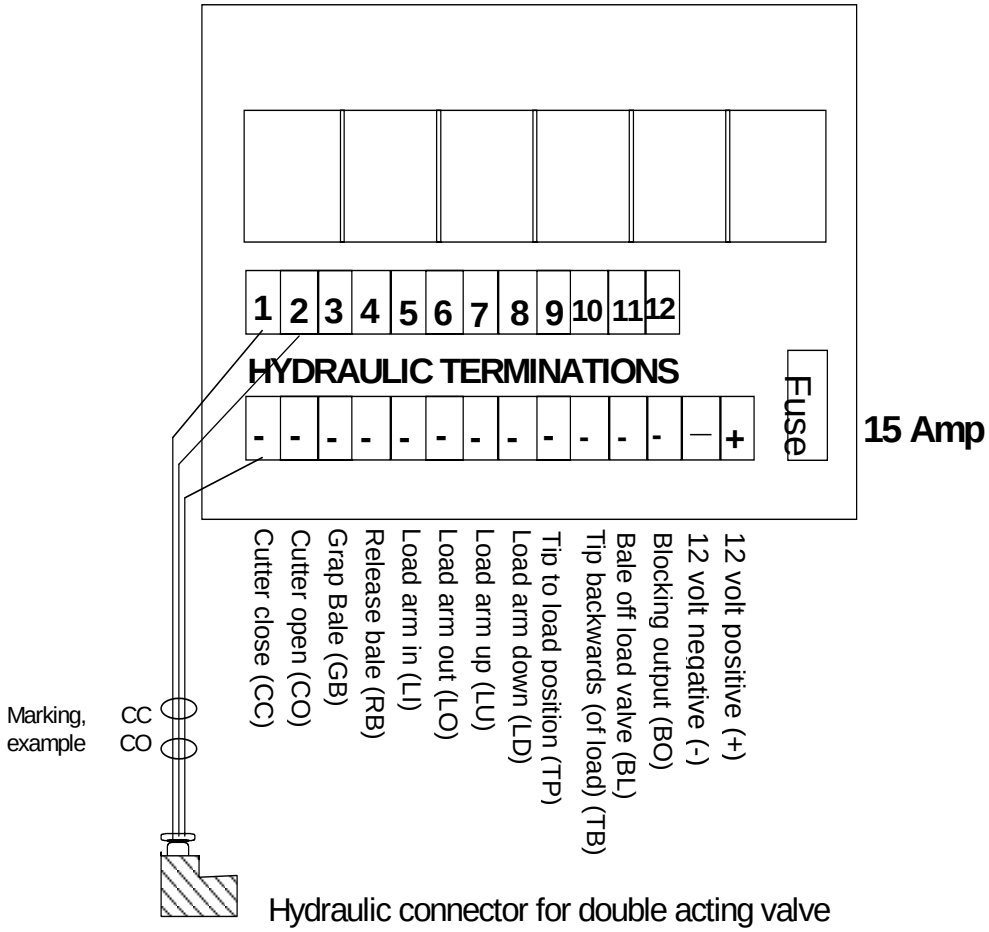
# 9 Technical details

## TERMINAL DESIGNATION
## SENSORS AND HYDRAULICS.

**Sensor cables are to be fitted into the controller at the workshop.**



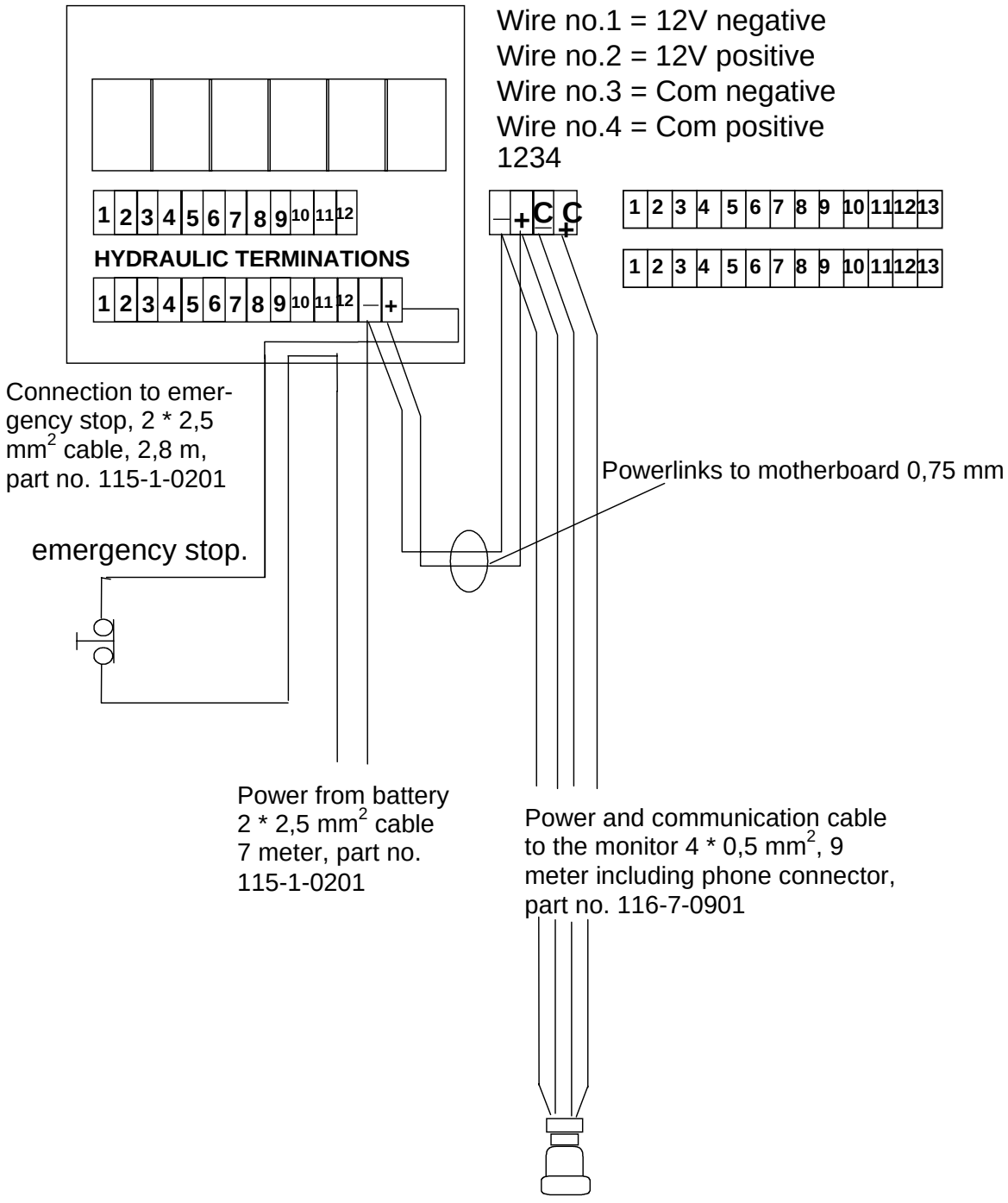
## HYDRAULIC OUTPUTS AND TERMINATION.



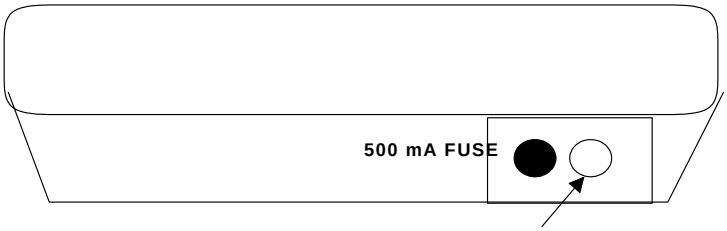

Hydraulic connector for double acting valve

Hydraulic connectors are fitted by Lykketronic. Cable 3*0,75 mm

# POWER AND COMMUNICATION.



## The Monitor.




POWER AND COMMUNICATION
BETWEEN CONTROLLER AND MONITOR.

**CONNECTOR TERMINALS FOR CONTROLLER 1.**

POWER AND COMMUNICATION TERMINAL 1: NEGATIVE 12 VOLT SUPPLY
2: POSITIVE 12 VOLT SUPPLY.
3: COMMUNICATION NEGATIVE.
4: COMMUNICATION POSITIVE.

NOTE! THE WIRE NUMBERS MUST CORRESPOND TO THE PIN NUMBERS IN THE CONNECTOR ON THE CONTROL PANEL AND THE INDICATED TERMINAL NUMBERS ON THE CONTROLLER POWER AND COMMUNICATION TERMINALS.