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New System M16

Vf Bander Operation:1090WRB3.2

With TWO or THREE Photo Eyes *New Rev. August, 2007, by PETER SCHUELER*
Rev. March 2008

2- Eye Version:

First Eye: In Front of the Needle, Clinton Eye:
The Eye operates the "NO SEW" function and the End of Cycle
Second Eye: Behind the needle, Kyence or Clinton Eye
The eye operates the chopper

3- Eye Version:

First Eye: In Front of the Needle, Clinton Eye:
The Eye operates the "NO SEW" function
Second Eye: Behind the needle, Kyence or Clinton Eye
The eye operates the chopper
Third Eye: Attached to the Folder, Kyence Eye: *End of Cycle*
End of Cycle: First Eye <u>AND</u> Third Eye has to be uncovered!!!

Before using the new system, please read this carefully !!!

Installation of the system:

       Never run the power cable of the motor parallel with the encoder cable of the motor because of high electrical noise.

       The speed selector (speed control) has to be properly grounded. Attach the braided wire to the metal of the control box or the sew head.

Power-On:

       Due the motor does not use commutator lines, the system has to check the location of the index in the power-on procedure. The motor has to be connected completely to the box (power- <u>and</u> encoder cable) before the power is turned on! The motor will not work, if it is connected after the power is already turned on.

       Caution !!

       The machine goes to the NEEDLE-DOWN position.

       The display reads: "GO DOWN POSITION"

       If the motor does not move (not plugged in properly etc.), this part can be bypassed by pushing the NU/ND button on the command box.

       In this case, the machine will not run !!

LCD- display box (Programmer)

       The LCD- display can be connected any time, even during the power is already turned on. (old system: The power has to be turned off)

Going to the "Hidden Parameters" or "MASTER RESET":

       a)   **Turn power on (The display reads "OPERATION MODE"**

       b)   **Turn the power off**

       c)   **The display reads "saving data" and "good bye, see you"**

       d)   **Push desired buttons and turn the power on before the display turns off.**

       For example enable the "HIDDEN PARAMETER":

       Follow steps 'a' to 'c' and push the buttons "NU/ND" and ARROW RIGHT" while turning the power back on

Set the Positions

       This is similar to the old system using the mini motor. There is a 'teach-in' mode in the 'hidden parameters', group ' POSITIONS'.

       Go to the desired parameter: 'NEEDLE UP' or 'NEEDLE DN' or 'TRIM", then turn the hand wheel to the desired position and press the NU-ND button.

       This will store the position. You can see the result in the display.

       Caution:

       You can not turn on the power and set the positions. The hand wheel has to turn at least one revolution to know about the location of the index.

Explanation of Functions:

"EBT" Push button: Manual cut. If the button is held down, it displays the
guard time

Heel 1:   **Rise the presser foot**

Heel 2:   **Rise the presser foot (same as 'heel 1')**

Heel 2 + NU/ND   **EoC (End of Cycle)**

Stitch Counters: **There are separate counters for the 2-Eye version and the
3-Eye version**

Cutter: **To make the tail length more precise, the machine stops for
cutting. This is a stop without position. To avoid the stop, set
the stop time to zero**

Download a "HEX"- file to program a memory chip:

The original program for the M16 systemstarts at address "F0000" HEX and
ends at "FFFFF"
The addresses from 00 to "EFFFF" are reserved for the internal ROM of the
CPU. After downloading the hex file from your computer to your
programmer, the hex file has to be moved from the higher address to the
start address "00000"

Display the PIN (Program Identification Number)
  1. **Turn the power OFF**
  2.   **Press the pedal forward**
  3.   **Turn the power ON while the pedal is held in forward position**
      (Don't worry, the machine (Motor) will not move)
      The LCD- display reads the PIN as long as the pedal is held down

How it works . . . .

2- EYE Version:

1st Eye in front of the needle: "NO-SEW" function at front and end.

2nd eye behind the needle: Cut the band at front and end and operate the puller / clamp.

Start: The machine will not start without covering the front eye.

"NO-SEW" function:

The first eye (front) controls the "no-sew" function at front and end:

There are three (3) counters available:

1. NO-SEW at the front:
   After end of cycle: cover the eye and the no-sew solenoid gets activated. The no-sew counter for the front starts counting. When the counter finishes, "No –sew" turns off. When the garment is finished and the front eye gets uncovered, counter #3 ("TRANSIT") starts. After finishing counter #3, the no-sew solenoid gets activated again to ensure the band for the next garment is not sewn at the front.

2. NO-SEW at the end:
   As soon the garment finishes and the front eye gets uncovered, the counters "END-NO-SEW" and "TRANSIT" start.
   The counter "END-NO-SEW" activates the no-sew solenoid.
   The counter "TRANSIT" turns the solenoid off.

The "TRANSIT" counter is not working if:

    b) The "NO-SEW" function is turned ON at the front and the end or

    c) The "NO-SEW" function is turned "OFF" at the front and the end

The second eye (behind the needle):

Leading edge (front): Sets the counter "FRONT CUT" to operate the cutter at the front. The machine speed is limited by "CUT SPD" (cut speed, see page 6 sect 4.1.2).

Trailing edge (end): Sets the counters "END CUT" and "PULLER ON" to operate the cutter and the puller / clamp at the end of the garment.

The speed is limited by ""CUT SPD" (cut speed page 6, 4.1.2)

The 'cut speed' limiter is always set when the counter for cutting is set (front or end).

3-EYE Version:

The same as the two-eye version, except:

The third eye (attached to the folder) operates the end of cycle. Both eyes (the first and the third) have to be uncovered in order to accept the third eye.

MODES OF OPERATION:

The LCD display can be operated in three (3) different modes.
   They are:
   1.   OPERATING MODE: To operate the machine
   2.   PROGRAMMING MODE: To change a parameter
   3.   TEST MODE   An easy way to maintain and check the system.

Two different parameter levels are available:
                          OPERATORS LEVEL
                          MECHANICS LEVEL

To use the MECHANICS LEVEL, please see the section 2.0.0 (Access to "HIDDEN PARAMERTERS)

1.0.0.   HOW TO CHANGE A PARAMETER:
             Four parameter groups are available (OPERATORS LEVEL)
                        SPEEDS
                        TIMERS
                        COUNTERS
                        TOGGLE SWITCHES.
             To change a parameter, please proceed the following sequence:

STEP 1
             Push the 'ARROW ROUND' button repeatedly until the desired parameter group is displayed.
STEP 2
             Push the 'SET' button repeatedly until the desired parameter is displayed
STEP 3
             Change the parameter with the buttons:
                          'ARROW-UP'   (increase the value)
               or   'ARROW DOWN'   (decrease the value)

             In the group 'TOGGLE SWITCHES' , either button, "ARROW UP" or "ARROW DOWN"
             will toggle the parameter.

PLEASE NOTE:
To optimize a certain parameter, it may be necessary to go repeatedly from the operation mode
back to the same parameter.
It can be easy done by pressing the 'SET' button.
If the program is in the OPERATION MODE, the SET button takes you right back to the last
displayed parameter.
Exemption:
If you are in the group "TOGGLE SWITCHES", the "SET" button brings you to the first parameter of the
group "TOGGLE SWITCHES"

If a parameter was changed by accident and the machine doesn't work properly, it is possible
to go back to the original factory setup by using the feature of the MASTER RESET (section 3.0.0).

2.0.0 ACCESS TO the 'HIDDEN PARAMETERS'

Step 1:
      Turn power OFF

Step 2:
      Press the NEEDLE UP / DOWN and ARROW RIGHT buttons at the same time.

Step 3:
      Turn the power ON while both buttons are held down.
      wait until a string of stars is displayed (******), which are counting down.

Step 4:
      Release both buttons and press the 'SBT' button before the stars disappear.

Go to the programming mode, the "HIDDEN PARAMETERS" follow after the regular parameters.
The hidden parameters display stars in front of the group name:
    Normal parameter: SPEEDS
    Hidden parameter: **** SPEEDS

The 'HIDDEN PARAMETER' groups are displayed after going through the OPERATOR level.

Note: Access to HIDDEN PARAMETERS is disabled after power was turned OFF.

      HIDDEN PARAMETERS are enabled automatically after proceeding a MASTER RESET.

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3.0.0 MASTER RESET: (Caution: Overwrites the program memory with the default settings)

Step 1:
      Turn the power off

Step 2:
      Press 'NEEDLE UP / NEEDLE DOWN','ARROW RIGHT' and 'ARROW UP' button at
      the same time.

Step 3:
      Turn the power ON while all three push buttons are held down. The display alternates between:
              ' PUSH SET '
              ' FOR RESET '

Step 4:
      Push the 'SET' button within 10 cycles. The display reads: ' PROGRAMMING '

Note:
      If the 'SET' button is not pushed within 10 cycles, the program goes to the main menu
      without executing the MASTER RESET.

4.0.0 Operators Parameters:
SPEEDS: rpm (spm, stitches per minute)

4.1.1   ENDspd.   **Speed limit when the sensor sees the end (eye 1 or Kyence eye),**
                                    Range: 300 to 4000
                                    Steps: 100
                                    Default: 900

4.1.2   CUTspd.   **Speed from eye 2 to cut the band**
                                    Range: 300 to 4000
                                    Steps: 100
                                    Default: 900

TIMERS   ms (milliseconds)

4.2.1   START   **Start Delay**
                                The delay from presser foot down to start.
                                If the foot is already down, this time will not affect.
                                Range: 30 to 500
                                Steps: 10
                                Default: 80

4.2.2   CUT on   **Cutting Time**
                                Range: 30 to 2500
                                Steps: 10
                                Default: 100

4.2.3   STOPtime   **The time to stop during cut**
                                Range: 13 to 2500
                                Steps: 10
                                Default: 100

4.2.4   CLAMPdly   **The time the clamp is delayed**
                                Range: 30 to 2300
                                Steps: 10
                                Default: 30

COUNTERS, (Numbers of Stitches)

4.4.0 Two Eye Version:

4.4.1   L–No Sew   Leading Edge No Sew   (No sew at the beginning)
Range: 1 to 50
Steps: 1
Default: 10

4.4.2   T–No Sew   Trading Edge No Sew   (No sew at the end)
Range: 1 to 50
Steps: 1
Default   12

4.5.3   TRANS.   Start Front NO SEW   If Front 'no-sew' is enabled:
The counter starts with eye1 is uncovered to start the no-sew
function earlier then at the end-stop.
Range: 1 to 50
Steps: 1
Default: 18

4.4.4   GAPstop   Gap Stop   same as sewing the end stitches
The counter after the front eye is uncovered to stop
Range: 1 to 50
Steps: 1
Default: 16

4.4.5   FRNTcut   Leading edge to Cut (Front)
Range: 1 to 50
Steps: 1
Default: 12

4.4.6   ENDcut   Trailing Edge to Cut   (End)
Range: 1 to 50
Steps: 1
Default: 18

4.4.7   PUL ON   Puller ON
The counter after the front eye is uncovered to start the puller
Range: 1 to 50
Steps: 1
Default: 12

4.5.0   Three Eye Version

4.5.1   L-No Sew   **Leading Edge No Sew   (No sew at the beginning)**
                                   Range: 1 to 50
                                   Steps: 1
                                   Default: 12

4.5.2   T-No Sew   **Trading Edge No Sew   (No sew at the end)**
                                   Range: 1 to 50
                                   Steps: 1
                                   Default   14

4.5.3   TRANS   **Start Front NO SEW   If Front 'no-sew' is enabled:**
                                   The counter starts with eye1 is uncovered to start the no-sew
                                   function earlier then at the end-stop.
                                   Range: 1 to 50
                                   Steps: 1
                                   Default: 18

4.5.4   GAPstop   **Gap Stop   same as sewing the end stitches**
                                   The counter after the front eye is uncovered to stop
                                   Range: 1 to 50
                                   Steps: 1
                                   Default: 18

4.5.5   FRNTcut   **Leading Edge to Cut   (Front)**
                                   Range: 1 to 50
                                   Steps: 1
                                   Default: 10

4.5.6   ENDcut   **Trailing Edge to Cut   (End)**
                                   Range: 1 to 50
                                   Steps: 1
                                   Default: 15

4.5.7   PUL ON   **Puller ON**
                                   The counter after the front eye is uncovered to start the puller
                                   Range: 1 to 50
                                   Steps: 1
                                   Default: 12

4.6.0 TOGGLE SWITCHES

4.5.1	PF/EOC	Presser Foot End of Cycle Default: DOWN	UP / DOWN
4.5.2	PF/seam	Presser foot in cycle Default: DOWN	UP / DOWN
4.5.3	Version	2-EYE / 3-EYE Default: 2-EYE	
4.5.4	POS in cyc.	Needle Position in Cycle Default: DOWN	UP / DOWN
4.5.5	POS E o C	Needle Position at the end Default: DOWN	UP / DOWN
4.5.6	LEADING NoSew	No Sew at the Front Default: OFF	ON / OFF
4.5.7	TRAILING NoSew	No Sew at the End Default: OFF	ON / OFF
4.5.8	FRONT LIMIT	Speed limit at the front Default: OFF	ON / OFF
4.5.9	HEEL 1	Pedal −1 position Default: ENABLED	ENABLED / DISABLED ***

***   To avoid rising the foot by accident, the "HEEL 1" function can be disabled.
To rise the foot, go to "HEEL 2"
To reset the program from "in cycle" to "end of cycle": HEEL 2 and the NU/ND-
button at the LCD- box

5.0.0 HIDDEN PARAMETER

5.1.0 ***** SPEEDS (rpm)

5.1.1   MINIM   **Minimum speed**
                        Range: **30 to 500**
                        Steps: **10**
                        Default: **200**

5.1.2   MAXIMUM   **Maximum Speed**
                        Range: **500 to 4500**
                        Steps: **100**
                        Default: **3800**

5.2.0 ****** TIMERS (milliseconds)

5.2.1   RES.BRK   **Residual Brake, The time the residual brake is turned on after stop**
                        Range: **0 to t1000**
                        Steps: **10**
                        Default: **40**

***** POSITIONS

Default settings are not important because the position
depends on the location of the Index (mounting the motor)
Using the "teach-in" mode, this parameter can be set the
following way:

1. **Go to the desired parameter (for example needle up)**
   The display reads the parameter and a number
2. **Turn the hand wheel to the desired position (needle-up)**
   The display does not change
3. **Press the "NEEDLE-UP/NEEDLE-DOWN" button**
   The display changes the actual number, this is the new position

5.3.1   UP. POS   **Needle up Position**
                        This parameter can be changed by:
                             d)   **Arrow-Up / Arrow-down Buttons**
                             e)   **Teach-in mode**

5.3.2   DN POS   **Needle Down Position**
                        This parameter can be changed by:
                             f)   **Arrow-Up / Arrow-down Buttons**
                             g)   **Teach-in mode**

5.4.0   ****** MISCELEN   (Miscellaneous)

Presser foot duty cycle:
Due the voltage is too high to turn on a solenoid valve permanent,
the current is turned on only a short time, after that, the current has
to be chopped.

If the duty cycle is too low, the solenoid will not stay on.
If too low, the solenoid will turn too hot!

5.4.1   PF 100%   **Presser foot on 100 %**
                       Range   10 to 1000
                       Steps: 10
                       Default: 200

5.4.2   PF DUTY   **Presser foot duty cycle**
                       Range   10 to 100
                       Steps: 10
                       Default: 50 (50%)

Acceleration / Deceleration Ramp:
The lower the number, the slower the Ramp!

5.4.3   ACCEL   **Acceleration ramp**
                    Range   20 to 50
                    Steps: 1
                    Default: 35

5.4.4   DECEL   **Deceleration ramp**
                    Range   20 to 50
                    Steps: 1
                    Default: 35

5.5.0 ****TOGG SW   TOGGLE SWITCHES

5.5.1   DIRECTN   **Direction of Rotation (CCW / CW)**
                     Default: CW (Clockwise)

5.5.2   START   **The next start after end of cycle**
                     the front eye (eye 2) must be covered or not covered
                     Default: covered

5.5.3   POSITION   **Normal / Fast**
                     Default: normal

5.5.4   Front Cut   **ON / OFF**
                     Default: ON

5.5.5   End Cut   **ON / OFF**
                     Default: ON

5.5.6   See Regs   **YES / NO**
                     Default: NO
                     THIS PARAMETER HAS NO MEANING TO THE USER
                     It is used to debug the software
                     Please do not change to YES!!

7.0.0 OPTIONS

Download a "HEX"- file to
program a memory chip:

**The original program for the M16 systemstarts at address "F0000" HEX and
ends at "FFFFF"**
**The addresses from 00 to "EFFFF" are reserved for the internal ROM of the
CPU. After downloading the hex file from your computer to your
programmer, the hex file has to be moved from the higher address to the
start address "00000"**

7.1.0 Using the Built-in Test Program

To enter: Press simultaneously the ARROW- RIGHT and the SBT button., release the
ARROW-RIGHT button first! Otherwise you are back in the main program!
   The display should read: **TEST MODE**

To go to the first group, press the "ARROW-ROUND" button
The display reads: **TEST THREADLE** for about 2 seconds
Then it reads the position of the threadle:

This can be: 1. NEUTRAL
          2. FORWARD and a number
          h) HEEL 1
          i) HEEL 1 / HEEL 2
If the threadle is in forward position, the displayed number is the reading of the
ADC- converter.
The lowest number should be below ten (10) and the highest number at least 245

To go to the next group, press the "ARROW-ROUND" button again
The next group is: **test inputs**
        (this will be displayed for two seconds)
Then activated inputs are displayed
If no inputs are activated, the display reads " --------------- "
Please note:
If any input is activated, no other input can be displayed.
The photo eyes have to be covered etc…..

To go to the next group, press the "ARROW-ROUND" button again
The next group is: **test outputs**

After two seconds, the display reads: **-1- PRESSERFOOT**

To activate the output, press the "NEEDLE-UP / NEEDLE-DOWN button.
To go to the next output, press the "ARROW-UP" button.
The next reading is;   **- 2 – KNIFE GUARD**
To go to the next output, press the "ARROW-UP" button.
To go to the former output, press the "ARROW-DOWN" button

To go to the next group, press the "ARROW-ROUND" button again

The next group is: **Test Encoder / Index**

The LCD- display reads the number of pulses of the encoder. Turn the hand wheel
And the number counts up or down, dependent on the direction. The index signal
resets the counter at 2000 (up) or 1 (down). If the encoder counts up and the
number changes at 2000 to 1, every thing is fine.

To go to the next group, press the "ARROW-ROUND" button again

The next group is: **Test Motor (Balance)**

This test allows testing the "balance" of the motor. If this adjustment is not
correct, the motor turns hot while operating.

To perform the test the motor has to be disconnected from the machine.

Push the NU/ND- button, the motor starts running with a low speed (100 rpm) for
about three revolutions. The display reads: **"WAITING FOR INDEX"**
 After the motor stops, the following message will be displayed:
 "CALCULATE OFFSET". When the offset is calculated, the result will be
displayed: **"ADJUSTMENT: + xx "** or **"ADJUSTMENT – xx"**
"+xx" or "- xx" represents a number. This number should not be higher then 15.
If the reading is not correct, please repeat the test (Press NU/ND again).

5.6 counts is one degree.

Vfc Bander M16

Inputs:

Connector: **20-2481-01**
Fem. Pin: **30-1930-01**
Male pin: **30-1931-01**

Flat   **8- pin inline connector on logic board**
M1   **6- pin Molex receptacle**
M1'   **6- pin Molex connector to 6- pin receptacle (pig tail)**
M2   **3- pin Molex**   **20 – 2481 – 01**
M2'   **3- pin Molex**   **20 – 2482 – 01**
M3   **2- pin Molex**
M3'   **2- pin Molex**

Photo eye 3   **(KYENCE, FS-V21R FU-67G)**

Funct.	------ INTERNAL-------		--------PIG TAIL ---------		Connection
	FLAT (CN3)	M1	M1'	M2	M2'
+ 12V	Pin 4 or	pin 3 (F)	pin 3 (M)	pin 1 (F)	pin 1 (M)
Signal	pin 7 gn	pin 5 (F)	pin 5 (M)	pin 2 (M)	pin 2 (F)
GND	pin 2 rd	pin 2 (F)	pin 2 (F)	pin 3 (M)	pin 3 (F)

Guard sensor   **(Proximity sensor)**

Function	-------INTERNAL-------		----------PIG TAIL ---------		Connection
	CN3	M1'	M1'	M3	M3'
Signal	pin 8 bl	pin 6 (F)	pin 6 (M)	pin 1 (M)	pin 1 (F)
			pin 2 (M)	pin 2 (M)	pin 2 (F)

Outputs

MOLEX 2- pin   **(Standard)**
Pin 1   **Presser foot**
Pin 2   **+36 V**

MOLEX 9-pin   **(Standard)**
Pin 1   **Puller**
Pin 2   **Clamp**
Pin 3   **no Sew**
Pin 4   **+36 V**
Pin 5   **+36 V**
Pin 6   **+ 36 V**
Pin 7   **Cutter**
Pin 8   **+36 V**
Pin 9   **Guard**

Important Parameter Default Settings:

SPEEDS:

END.spd	900 spm
CUT spd	900 spm

Timers:

Strt Del	80 ms
Cut on	100 ms
Pul rtn	90 ms
STOPtime	150 ms

Counters   2- EYE Vers.

L-No Sew	10 st
T-No Sew	12 st
STRTfrnt	12 st
GapStop	16 st
FRNTcut	12 st
End cut	18 st
Pu On	12 st

Counters   3- EYE Vers.

L-No Sew	10 st
T-No Sew	14 st
STRTfrnt	14 st
GapStop	18 st
FRNTcut	10 st
End cut	15 st
Pu On	12 st

Toggle Switches:

PF/EoC	DOWN
PF/seam	Down
Version	2- EYE
PO in Cye	DOWN
Needle/Seam	Down
Fron no Sew	OFF
End no Sew	OFF

****SPEEDS

Trim/Pos	230 spm
Maximum	3800 spm

****TIMERS

Res.BRK	20 ms

****POSITIONS

There is no way to set a DEFAULT position!

*** MOT. GAIN ###   **Special Parameter for PID- control – Not Shown**

Motor gain for normal running:
I-PART   **50**
P-PART   **40**
CURRENT   **25**
D-PART   **25**

Motor gain for positioning only:
i-part   **50**
p-part   **40**
current   **25**
d-part   **25**

****MISCEL.

PF 100%   **200 ms**
PF DUTY   **50 %**
ACCEL   **35**
DECEL   **35**

****TOGGLE SW
DIRECTN   **CW**
START: **EYE covered**
POSITION   **fast**
FRONT cut   **ON**
END cut   **ON**
SEE REGS   **OFF**

# # #
MOTOR GAIN:
To see this parameters it needs a special code for extended "HIDDEN PARAMETER"