

# Closed Loop Web Tension Controller **OWC330**

## Technical Manual



CONTENTS

<b>1</b>	<b>HOW DOES IT WORK?</b> .....	<b>4</b>
<b>2</b>	<b>GENERAL OPERATION</b> .....	<b>8</b>
2.1	OPERATOR SCREEN 1 .....	8
2.2	OPERATOR SCREEN 2 "METER MODE" .....	9
2.3	THE POP-UP KEYBOARDS .....	10
<b>3</b>	<b>INSTALLATION</b> .....	<b>11</b>
3.1	MECHANICAL INSTALLATION, MOUNTING THE BOXES .....	11
3.2	CABLE CONNECTIONS .....	12
3.3	ELECTRICAL INSTALLATION .....	13
3.3.1	<i>Warning and Safety</i> .....	13
3.3.2	<i>Machine Signals diagram</i> .....	14
3.3.3	<i>Machine Signals Description</i> .....	15
<b>4</b>	<b>SETUP THE CONTROLLER STEP BY STEP</b> .....	<b>16</b>
4.1	STEP 1...STATUS SCREEN .....	17
4.2	STEP 2 LANGUAGE SCREEN .....	17
4.3	SETUP SCREEN .....	18
4.4	STEP 4 "TARE" LOAD CELLS .....	19
4.5	STEP 5 "TEACH LOAD CELLS .....	19
<b>5</b>	<b>OPTIONAL FEATURES</b> .....	<b>20</b>
5.1	RANGEEXPANDER .....	20
5.2	ANALOG DIAMETER MEASUREMENT .....	21
5.2.1	<i>Core Teaching</i> .....	21
5.2.2	<i>Roll Teaching</i> .....	21
5.3	PULSE DIAMETER CALCULATION .....	22
5.3.1	<i>5.9.1 Teaching</i> .....	22
5.3.2	<i>Diameter calculation Description</i> .....	23
5.4	TUNING .....	24
5.5	SMALL ROLL: .....	24
5.6	LARGE ROLL: .....	25
5.7	PI .....	26
5.8	FAST STOPS .....	27
<b>6</b>	<b>PARAMETER MENU</b> .....	<b>28</b>
6.1	SETUP SCREEN .....	28
6.1.1	<i>Block diagram</i> .....	29
6.2	DIGITAL INPUTS .....	30
6.3	DIGITAL OUTPUTS .....	30
6.4	ANALOG INPUTS .....	31
6.5	ANALOG OUTPUTS .....	31
6.6	GAIN SETUP SCREEN .....	32
6.7	PID PARAMETERS SETUP .....	33
6.8	FAST STOPS .....	34
6.9	CONFIG SCREEN "OPTIONAL FUNCTIONS" .....	35
6.10	TAPER TENSION .....	36
<b>7</b>	<b>STATUS SCREEN AND CHART RECORDER</b> .....	<b>37</b>

---

<b>8</b>	<b>APENDIX A</b> .....	<b>38</b>
8.1	WIRING DIAGRAMS.....	38
8.1.1	<i>PCB Comtroller terminals</i> .....	38
8.1.2	<i>Load cell diagram</i> .....	39
8.1.3	<i>IP Converter diiagram</i> .....	40
8.1.4	<i>Range expander diagram</i> .....	41
8.1.5	<i>Proximity sensor Puls diameter</i> .....	42
8.1.6	<i>Analog Diameter Sensor</i> .....	43
<b>9</b>	<b>PART NUMBER AND ORDERING INFO</b> .....	<b>44</b>
9.1	PART NUMBER SCREEN.....	44
9.2	PART NUMBER SELECTION PLAN.....	45

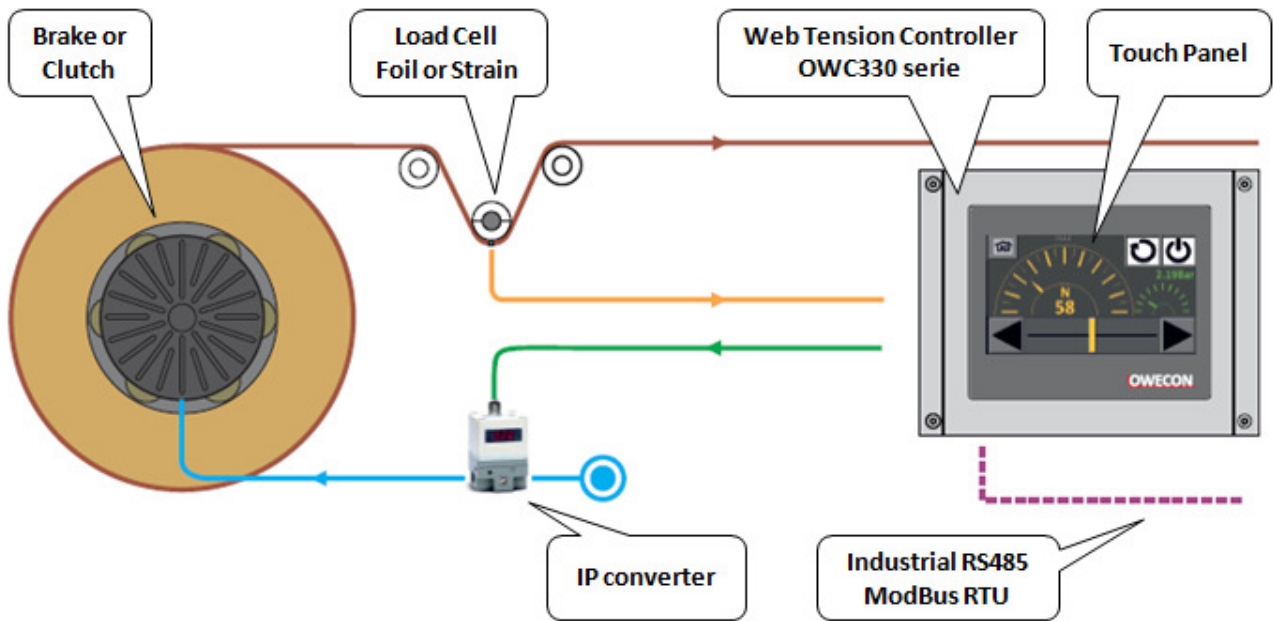
# 1 How does it work?

## 1.1 General description

OWC330 is a closed loop tension controller for use in various web unwind applications, it features optimum ease in installation, setup and use.

In the basic applications, measurement of the web tension is done by load cells. The signal is computed by the controller and forwarded via an interface to the actuating component, in most cases a pneumatic brake

A change (+ or -) in expected tension calculated by the controller results in a reactive signal (- or +) on the output - controlling the actuating component, and so the web Tension.



Working principle of the closed loop tension control method using the Owecon OWC330 controller, Load cell configuration

Terms and definitions:

### Load cell function

Two load cells – or tension sensors – are used. The load cell signals are added together by an amplifier to indicate a total web tension expression. Each load cell has 2 strain gauges in series, 2 load cells form a resistor full-bridge, which is supplied with 5 VDC

### I/P converter function

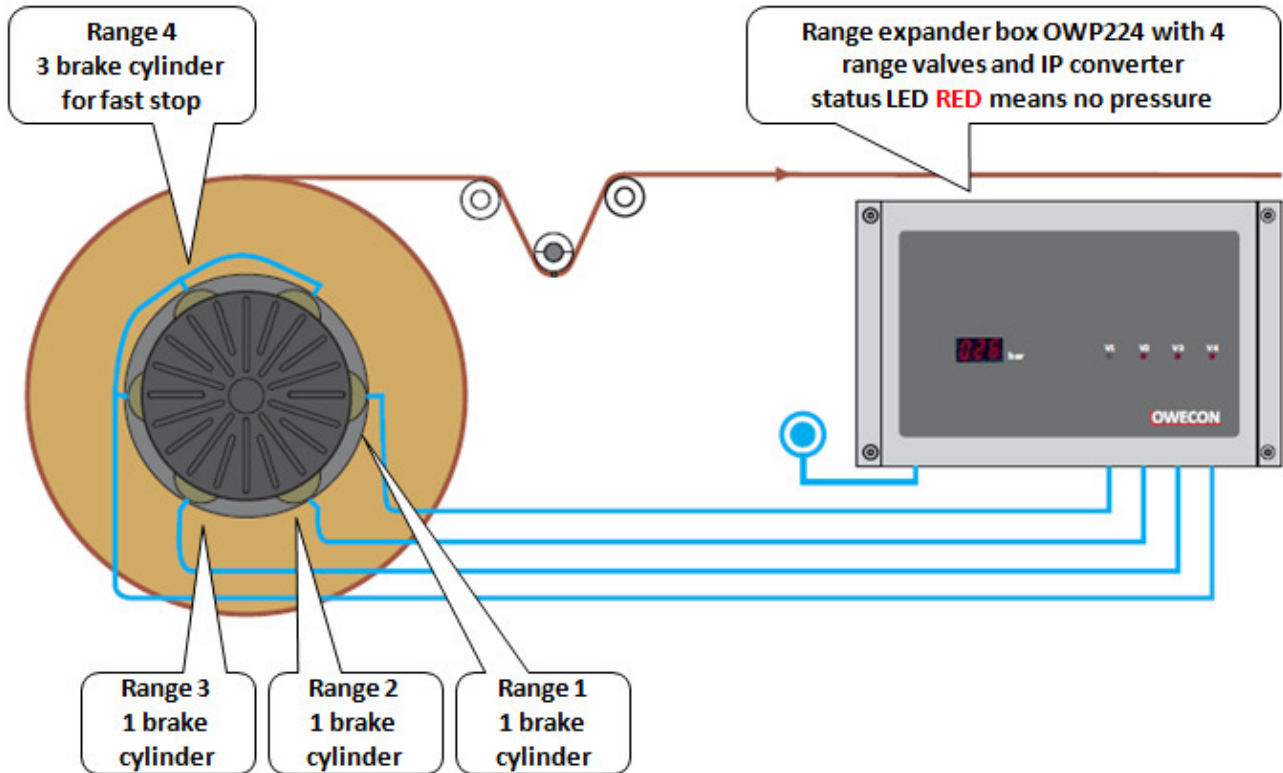
The I/P converter converts the regulator output from the OWC330 controller into a proportional 0 to 6 Bar to control a pneumatic brake/clutch.

### Brake

Pneumatic brakes are controlled by the air pressure from the I/P converter or pneumatic interface box / Range Expander circuit.



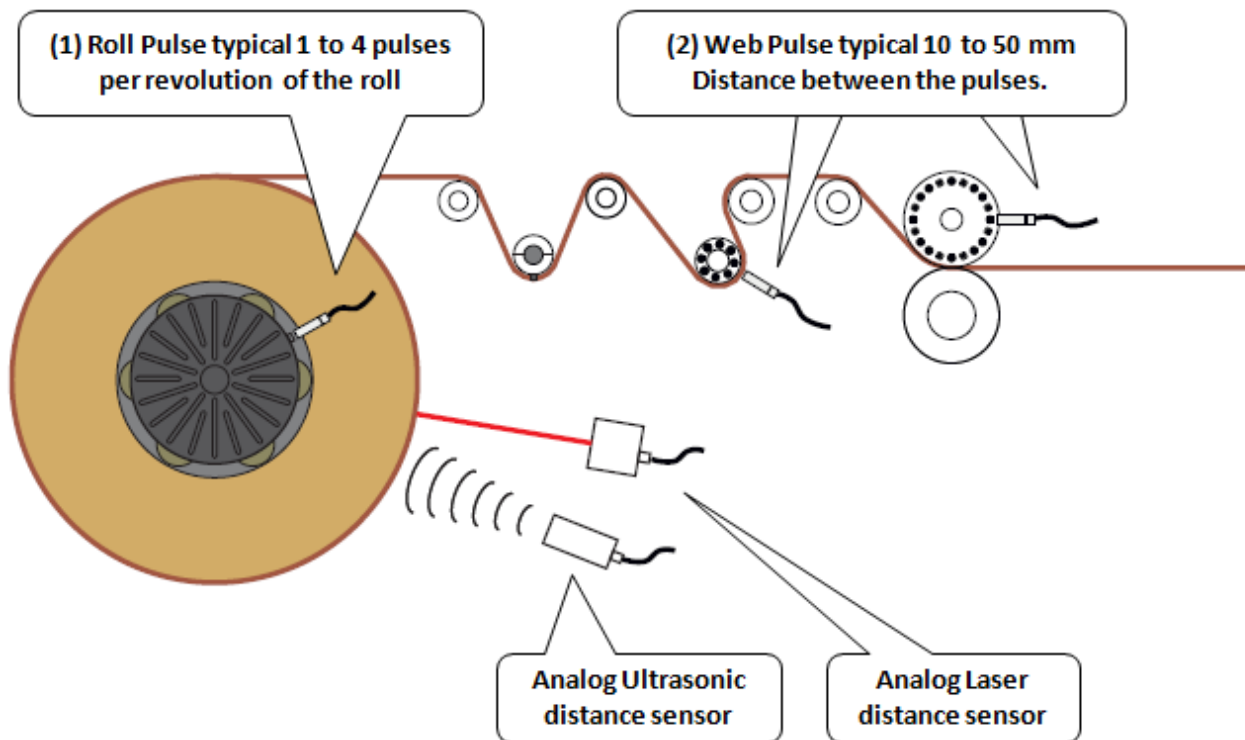
### 1.2 Range Expander *optional*



Pneumatic interface box containing both the I/P converter and a set of magnetic valves, enabling the OWC330 controller to switch the number of brake-modules used, as a function of the load on the brake, emergency stop etc.

The Range Expander enables the use of a larger brake, with extra torque resources, even when smaller torques / fine regulation is needed.

### 1.3 Diameter signal *optional*

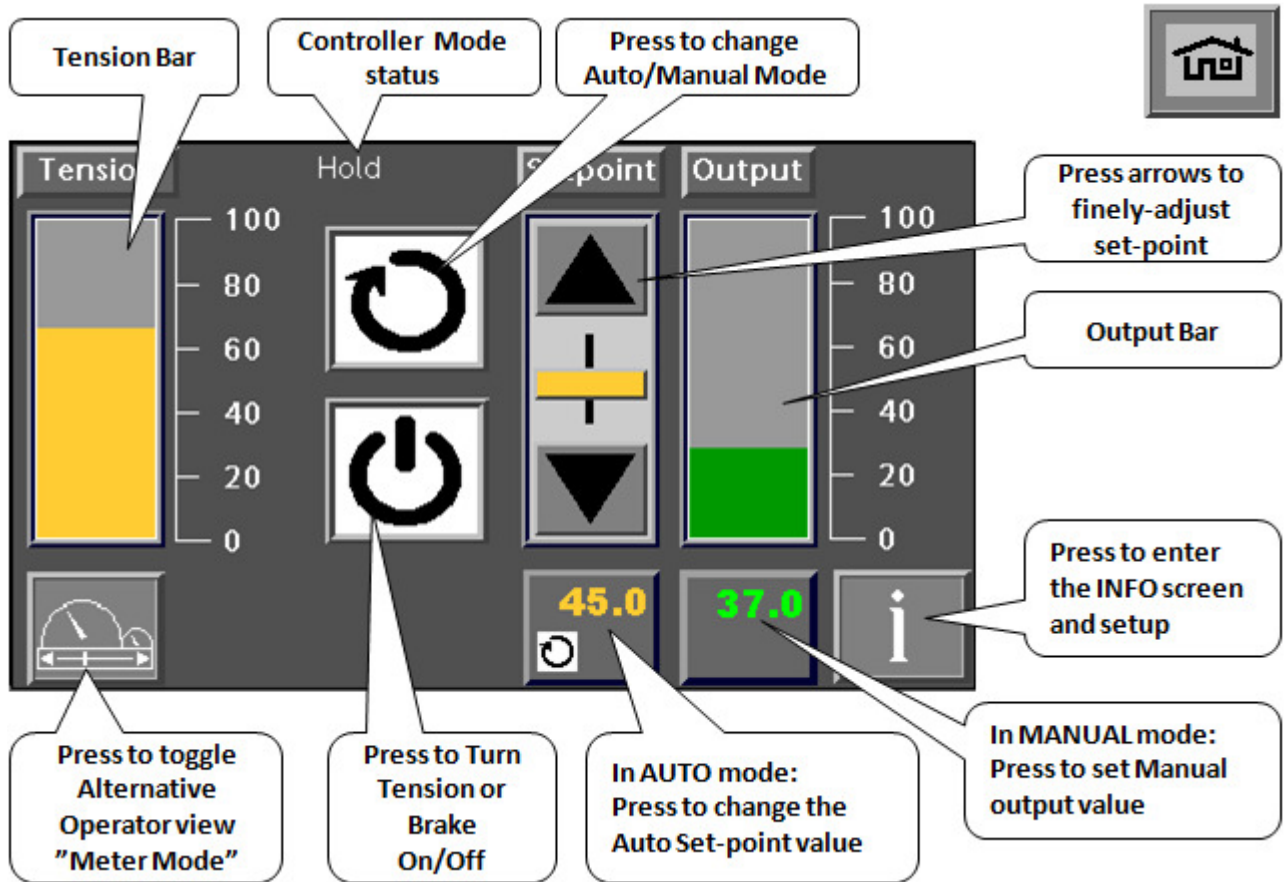


To optimize a system, a diameter signal is recommended. An expression for the actual roll diameter can be calculated from 2 proximity switches, counting pulses from the unwind roll/brake and an idler roller (at web speed ). **The sensor is ideally mounted on any roller that represents line speed and does not slip relative to the web. Choose rollers such as positive grip idlers, driven shafts / nips.**

Alternatively, the diameter is read by an analogue sensor, ultrasonic or laser.

## 2 General operation

### 2.1 Operator Screen 1

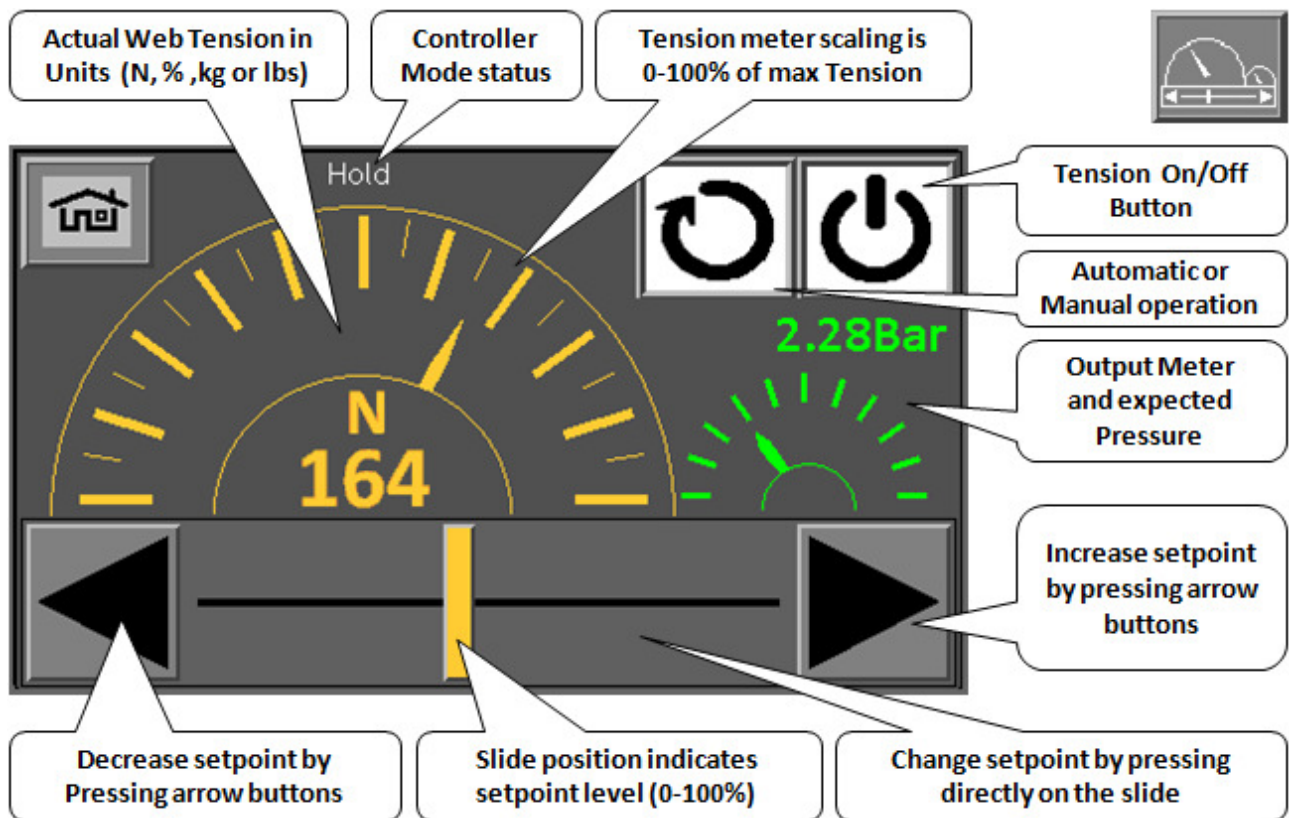


#### Controller Status Mode:



- Hold
- Run Auto
- Run Man
- Tension Off
- Stop
- Manual
- Splice (optional)



## 2.2 Operator Screen 2 "Meter Mode"



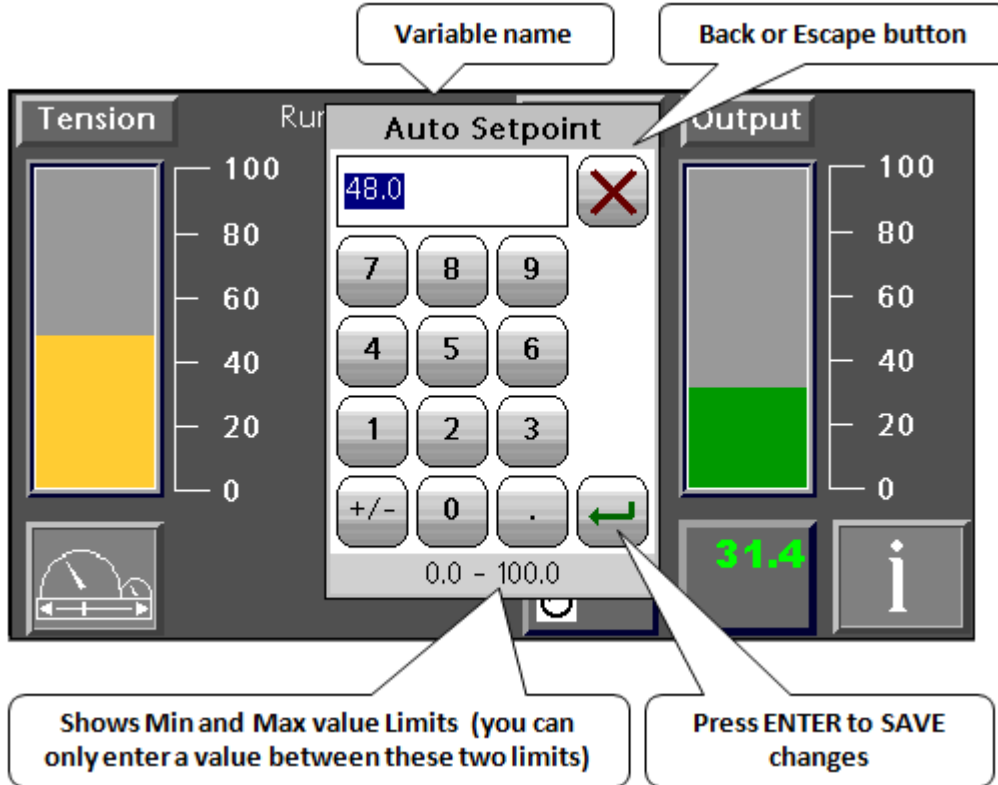
Press the OFF key  to change status to ON:   
 This function is used to hold/release the roll.

Pressing the MANUAL key  changes the working mode to AUTO   
 In AUTO MODE, the output will be controlled automatically, according to Auto Setpoint and the present input from the sensor. The system works in closed loop mode.

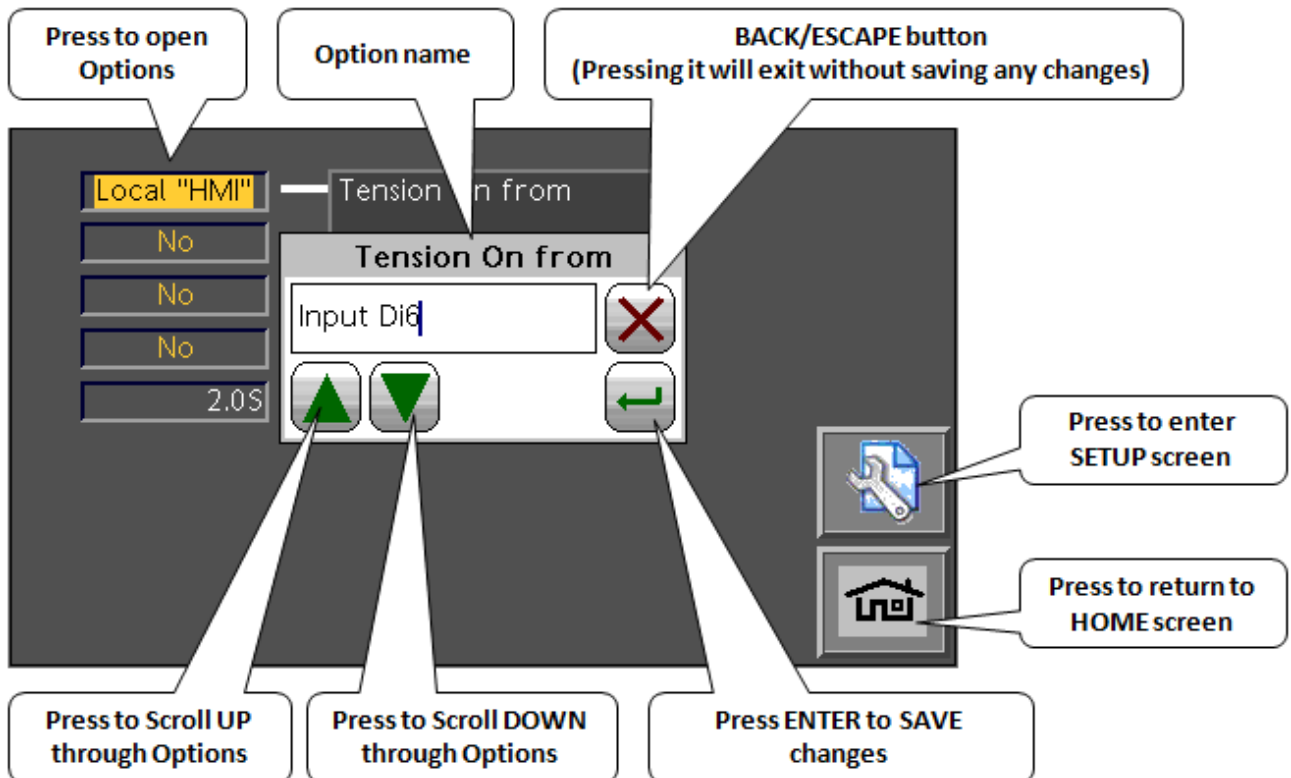
In MANUEL MODE , the output value stays constant, the system works in an open loop mode and requires adjustment from the operator.  
 Setpoints can be changed by pressing the numeric value or using the "up/down" arrows.

### 2.3 The Pop-Up Keyboards

By pressing the numeric value-button, the Pop-Up Keyboard is shown.



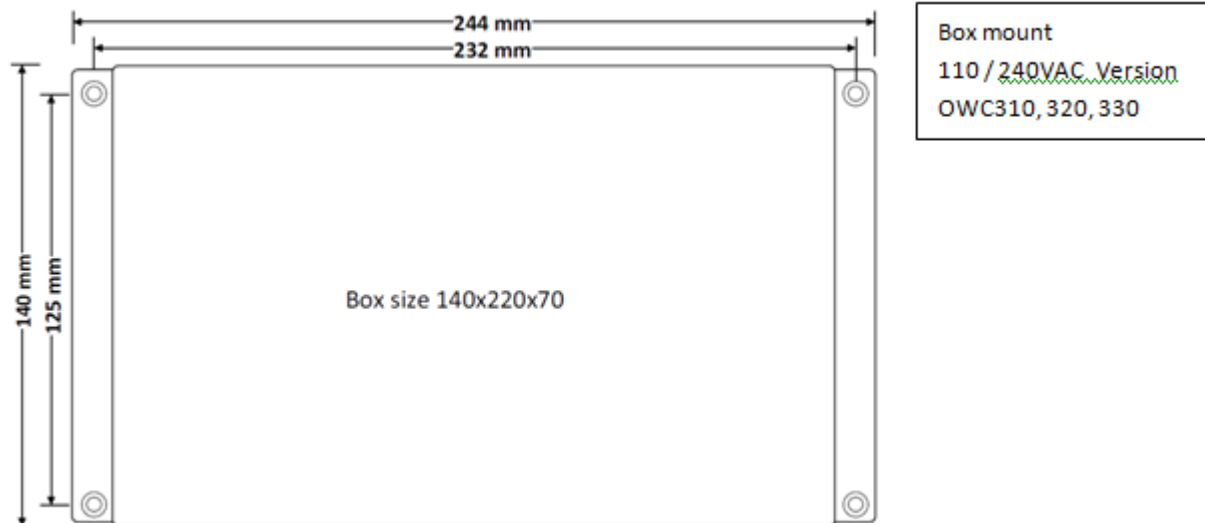
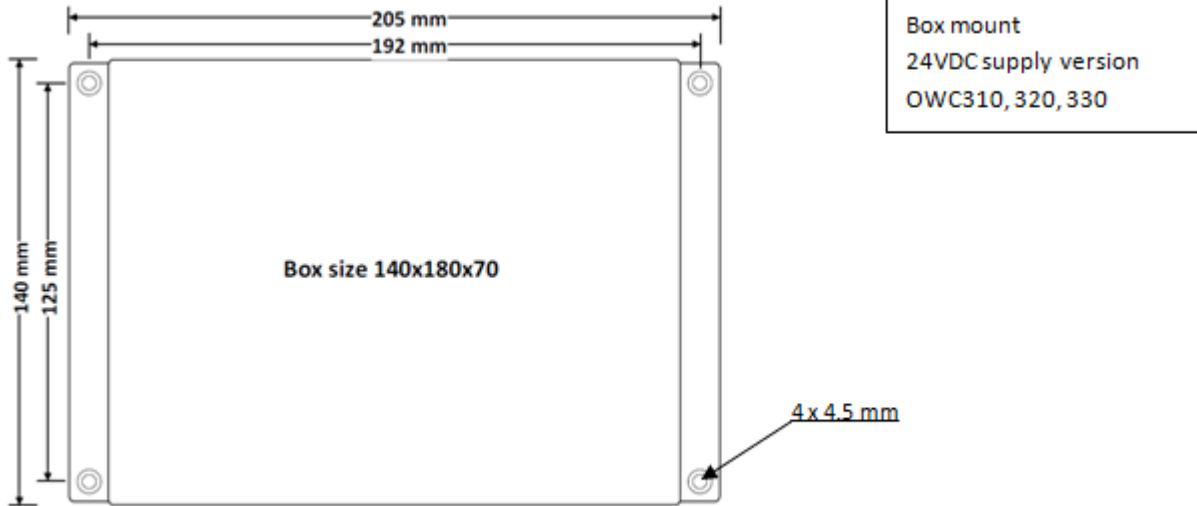
The Pop-Up Keyboard is a multi input tool, to use for all data value entries. Simply touch a datablock in the program for entry - and the keyboard pops up. Enter by touching the keys w. finger or pen.



### 3 Installation

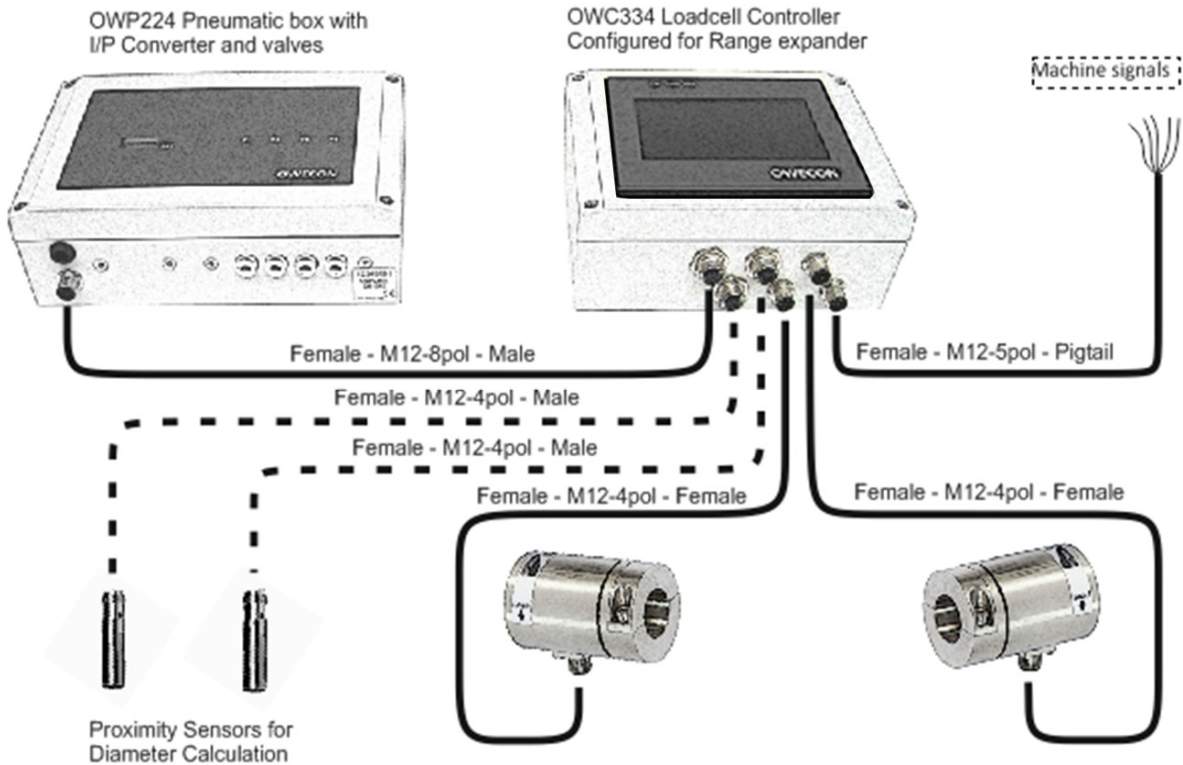
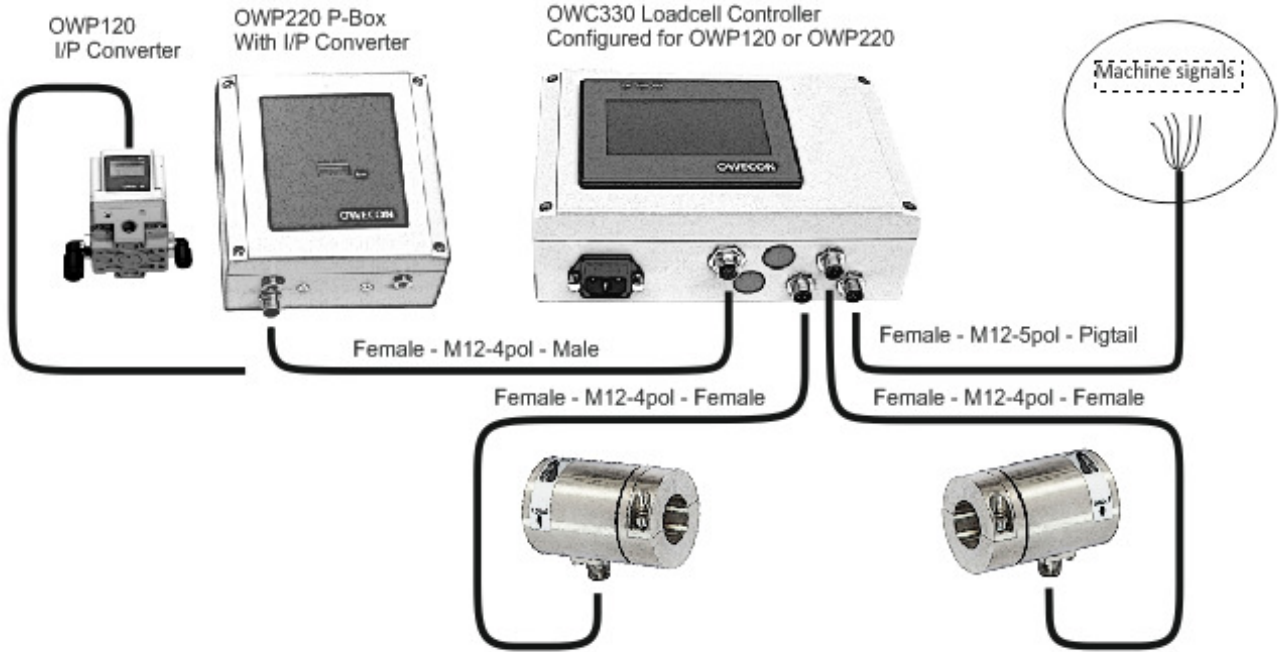
Installation is done by follow the chapters: 3.1 – 3.2 – 3.3 – 3.4.  
This will get your system up running.

#### 3.1 Mechanical Installation, mounting the boxes



### 3.2 Cable Connections

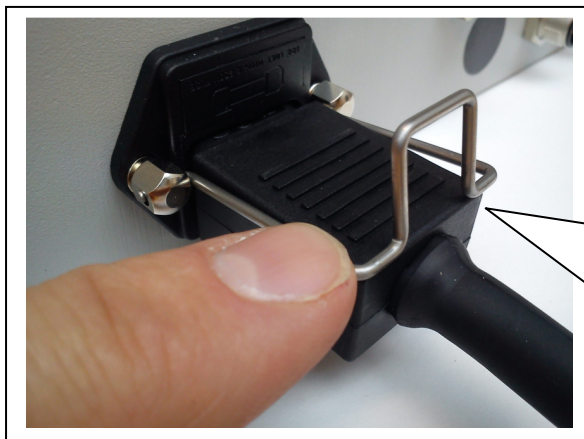
Connector to the controller with the prepared cables as shown.



### 3.3 Electrical Installation

#### 3.3.1 Warning and Safety

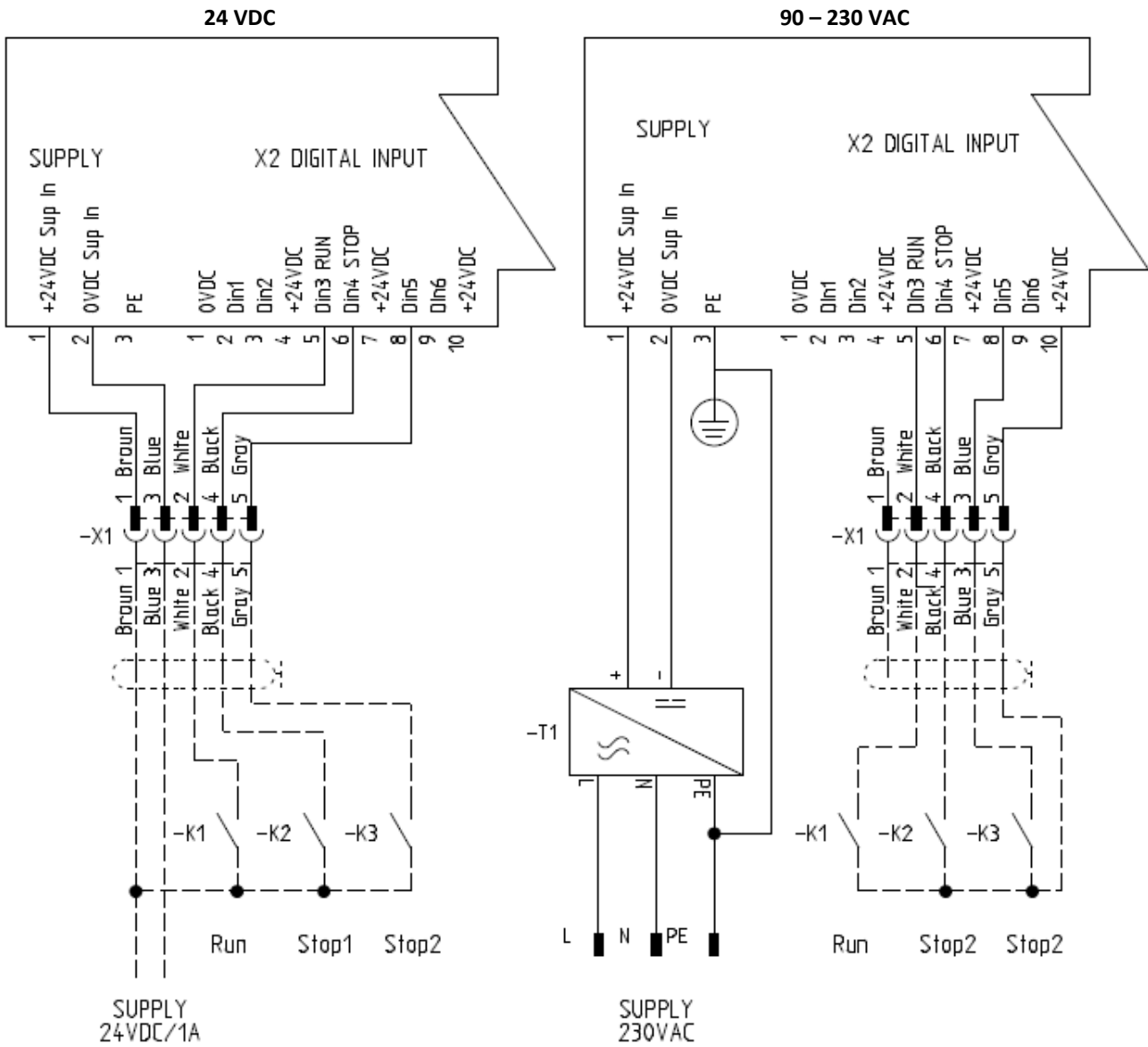
- Electrical installation must be done by authorized personnel. Wiring must meet all applicable codes and standards.
- Refer to the appropriate wiring and terminal descriptions for external connections.
- An external 1A fuse is integrated in the cabinet power connector.
- **Always double check the cable connections before applying Power to the system, damage caused by improper wiring is not covered by warranty**



**After connecting the loadcells and I/P converter:**

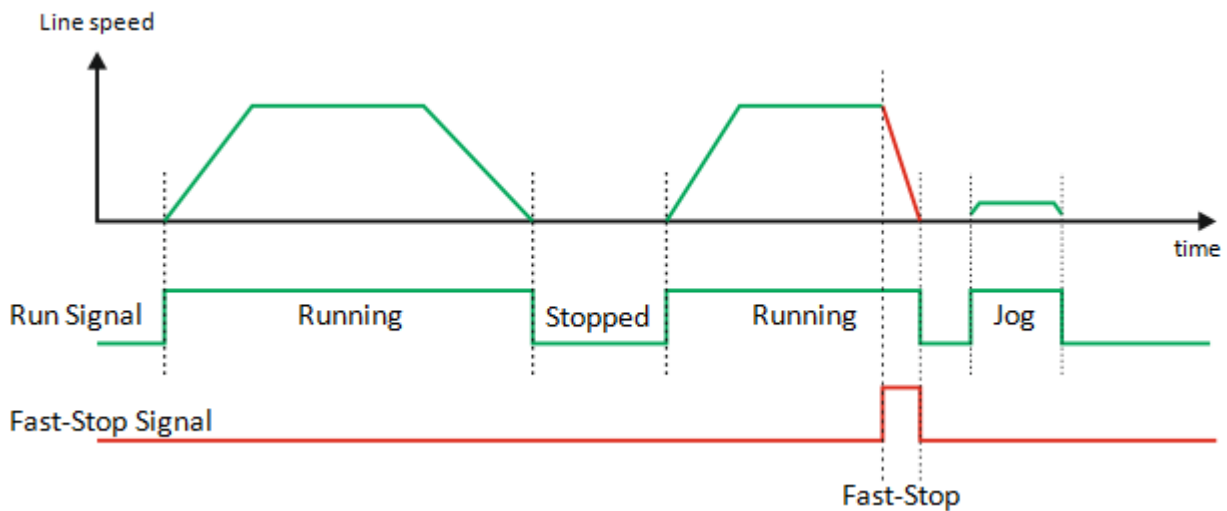
**Connect the 90-230 VAC supply via the supplied power cable connector to the OWC300 controller box. Secure the power plug using the integrated safety spring**

**3.3.2 Machine Signals diagram**



Digital inputs are active with a High 24VDC signal for PLC connections use PNP output and common ground 0VDC. Di 3-6 can be inverted under the Digital input menu under setup

### 3.3.3 Machine Signals Description



The **run** signal serves the following purposes:

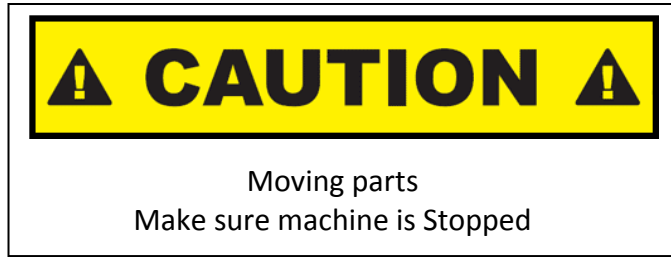
1. At start of the machine, the controller goes into run mode Auto and regulates the brake torque to obtain correct tension
2. At machine still stand the controller goes in to hold mode, the brake torque stays at a constant level to insure an optimal web tension at restart of the machine.


Note: The run signal shall ideally always be activated when the web is moving, also when turning or inching the machine. The Run Signal applies on Digital input 3

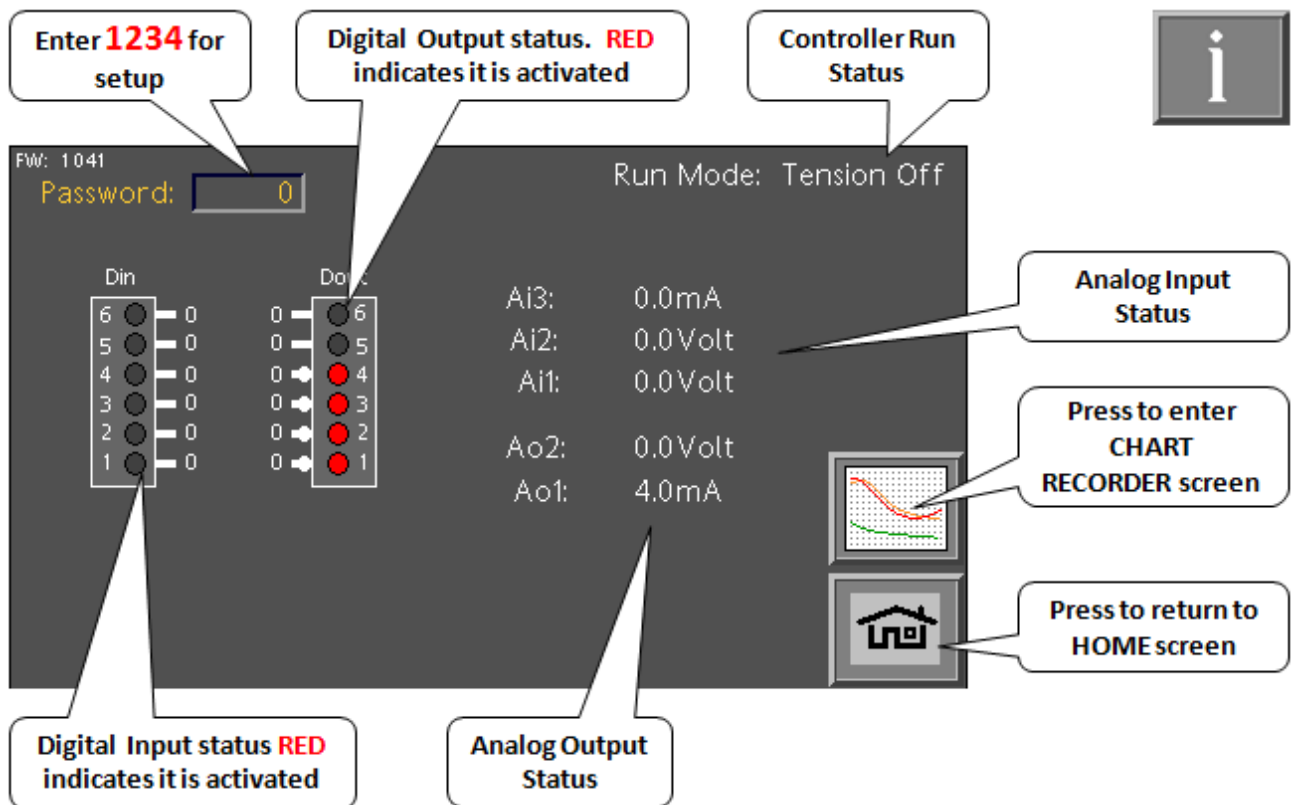
The **Stop** signals should be applied if the tension drops during stopping of the machine. When the stop signal is applied the brake torque will increase directly to compensate for the inertia of the running roll during deceleration of the machine.

Note: Using the diameter calculation or measurement features, the controller calculates the mass of the roll allowing controlled fast stop of the machine with control of the web tension

## 4 Setup the controller Step by step



Press the STATUS Button  on the Operator screen to go to the Status Screen



**Enter 1234 for setup**

**Digital Output status. RED indicates it is activated**

**Controller Run Status**

**Analog Input Status**

**Press to enter CHART RECORDER screen**

**Press to return to HOME screen**

**Digital Input status RED indicates it is activated**

**Analog Output Status**

FW: 1.041  
Password:

Run Mode: Tension Off

Din	Do	Ai	Ao
6	0	Ai3: 0.0mA	Ao2: 0.0 Volt
5	0	Ai2: 0.0 Volt	Ao1: 4.0mA
4	0	Ai1: 0.0 Volt	
3	0		
2	0		
1	0		



### 4.1 Step 1...Status Screen

FW: 1041  
 Password: 1234  
 Run Mode: Tension Off

Din		Dout	
6	0	0	6
5	0	0	5
4	0	0	4
3	0	0	3
2	0	0	2
1	0	0	1

Ai3: 0.0mA  
 Ai2: 0.0Volt  
 Ai1: 0.0Volt  
 Ao2: 0.0Volt  
 Ao1: 4.0mA

Press to enter LANGUAGE SELECTION Screen  
 Press to enter SETUP screen  
 Press to enter Chart recorder  
 Press to return to HOME screen

### 4.2 Step 2 Language Screen

English, Metric

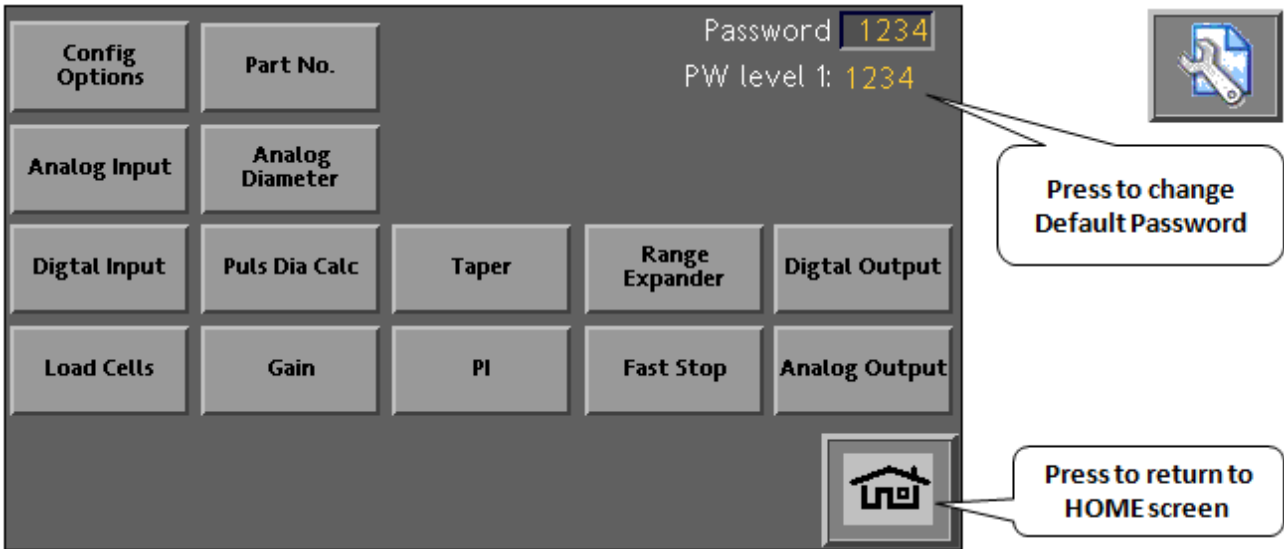
Tension Unit: N  
 Output Unit: bar

Status for language selection and units  
 Engineering Units for analog displays  
 Press flag for your selection of language for display screen instructions  
 Press to return to the STATUS SCREEN



From the Status screen: press  to get to the general Setup screen:

### 4.3 Setup Screen



From here, you can, via the buttons, access the individual function blocks needed.  
The number of available blocks on the screen will depend of the configuration part number

#### 4.4 Step 4 "TARE" Load Cells

The Screen instructions will be in the selected language

**Load Cell AND amplifier status**  
Load Cell is ready and running

**Load cell amplifier output level**  
23.19%

1. Loosen or remove the web so no tension is applied to the Load cell roller  
2. Press the "TARE >0<" Button

**Tare >0<**

**Next -->**

**Return to the SETUP SCREEN**

**Return to the HOME screen**

**(2) Press to proceed to the teaching/calibration screen**

**(1) Press to "TARE" the Load cell amplifier output level to zero**

Load Cell

#### 4.5 Step 5 "TEACH" Load Cells

**Load Cell AND amplifier status**  
Load Cell is ready and running

**Load cell amplifier output level**  
49.13%

1. Thread a rope over the center of the Load cell roller following the path of the web. Fasten one end of the rope and apply a known weight to the other end.  
2. enter the value of the weight and the max Tension in the fields.  
3. Press the "TEACH" Button.

Max Tension =  N Unit:

**Teach**

**<-- Back**

**(2) Enter your maximum desired web tension**

**(1) Press to select Unit for analog meter N, kg, lbs or %**

**Return to the SETUP screen**

**Return to the HOME screen**

**(4) Press to "Teach" the Load cell amplifier**

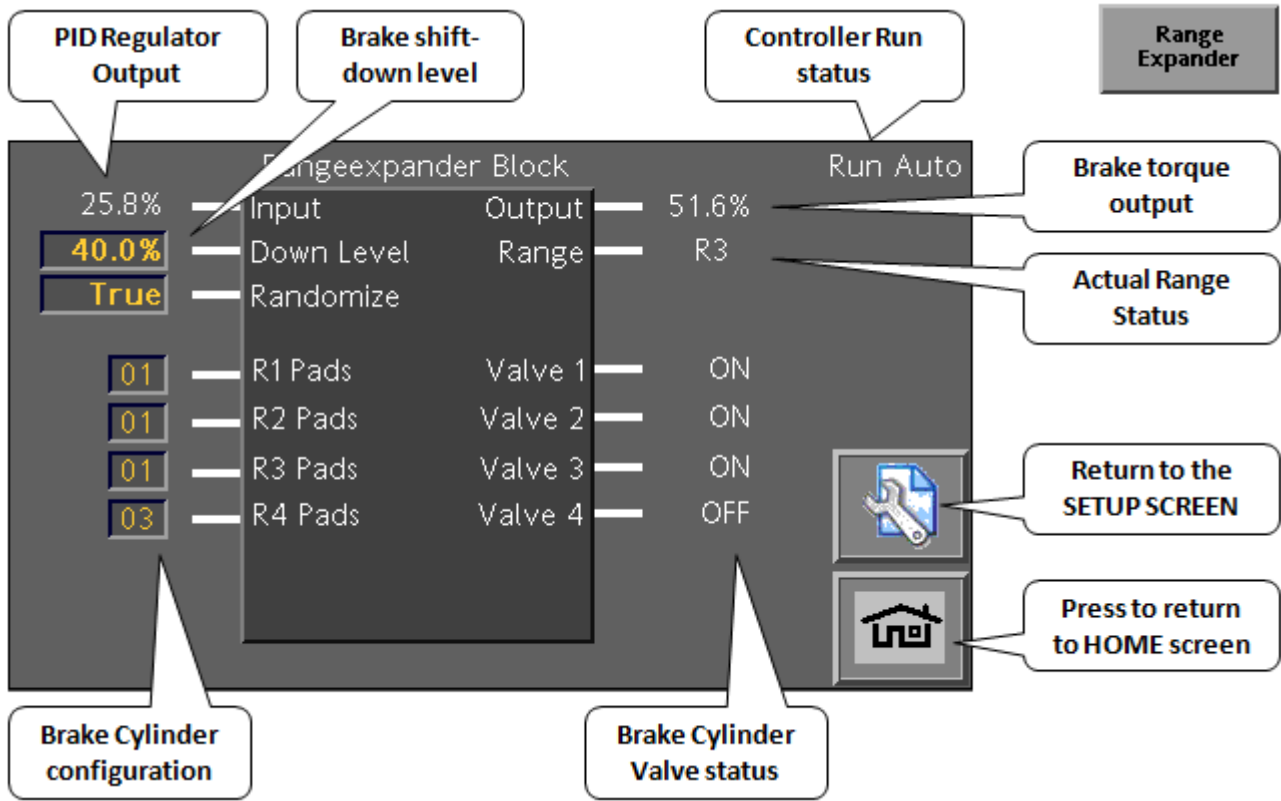
**The roller shall be free spinning for correct calibration**

**(3) Enter the value of your known weight for calibration**

10.0 kg

## 5 Optional Features

### 5.1 Rangeexpander



Parameter	Description	Value
Output	Output from Range Expander	0 – 100%
RE State	Actual Range status	R1 - R6
Valve 1-6	Actual valve status 1-6	False - True
Input	Input from PID controller	0 – 100%
Down Level	Threshold value for the new output	0 – 100% Default: 30%
Randomize	Function for even wear of friction pads	False – True Default: True
Pads R1 – R6	Number of friction pads per area (R1 – R6)	0 – 12 (Default: 1)

Note. The number of ranges is defined via the part number configuration

## 5.2 Analog Diameter measurement

### 5.2.1 Core Teaching

**Analog Diameter**

Check or select the sensor input  
Ai2: 0-10V or Ai3: 4-20mA

1. Select Diameter sensor input -----> **Ai3 4-20mA**
2. fill in the min diameter -----> **96mm**
3. Place an empty core in the roll stand
4. fill in the Core diameter -----> **100mm**
5. Press the "Teach Core " Bottom

OD of the minimum core

OD of the actual core diameter

Return to the Setup screen

Press to return to HOME screen

Teach Core

Next -->

101mm **Teached**

Actual diameter measured

Conformation for Teaching

### 5.2.2 Roll Teaching

1. fill in the max diameter -----> **1200mm**
2. Place an Large Roll in the roll stand
3. fill in the Roll diameter -----> **1050mm**
4. Press the "Teach Roll" Bottom

OD of the Max Roll diameter

OD of the actual Roll diameter

Return to the Setup screen

Press to return to OPERATOR / HOME screen

Teach Roll

<-- Back

1049mm **Teached**

**5.3 Pulse Diameter calculation**

**Puls Dia Calc**

1. Enter Max roll and the Smallest Core Diameter  
2. to TEACH Roll Diameter Press Next-->

1200mm — Max. Roll Diameter — 50.0% — Actual roll diameter %  
 96mm — Core Dia. Diameter — 600mm — Actual roll diameter mm  
 50.0% — Start Dia. Raw Dia — 600mm — Unfiltered roll diameter mm  
 4 — No of Roll Puls  
 OFF — Roll Puls  
 OFF — Web Pulse

Next -->      Return to the Setup screen  
 Press to return to HOME screen

Max roll diameter used      Smallest core OD used

Default diameter at roll change      Number of pulses per brake revolution

Parameter	Description	Value
Max. Roll	Entry field for max. roll diameter	0 – 3000 mm
Core Dia.	Entry field for core diameter	0 – 500 mm
Start Dia.	Start diameter for new roll	0.0 – 100.0 %
No of Roll Puls	Entry field for number of roll pulses of proximity switches	1 – 4

**5.3.1**

**5.9.1 Teaching**

1. Place a large Roll in the roll stand and web up.  
 2. Measure the roll Diameter and fill in -----> 973mm — Diameter of the roll for teaching  
 3. Select Manuel mode and set a low Tension  
 4. Run the machine at low speed. Press the TEACH Button  
 5. Let the roll teach for 3-4 revolutions then press DONE

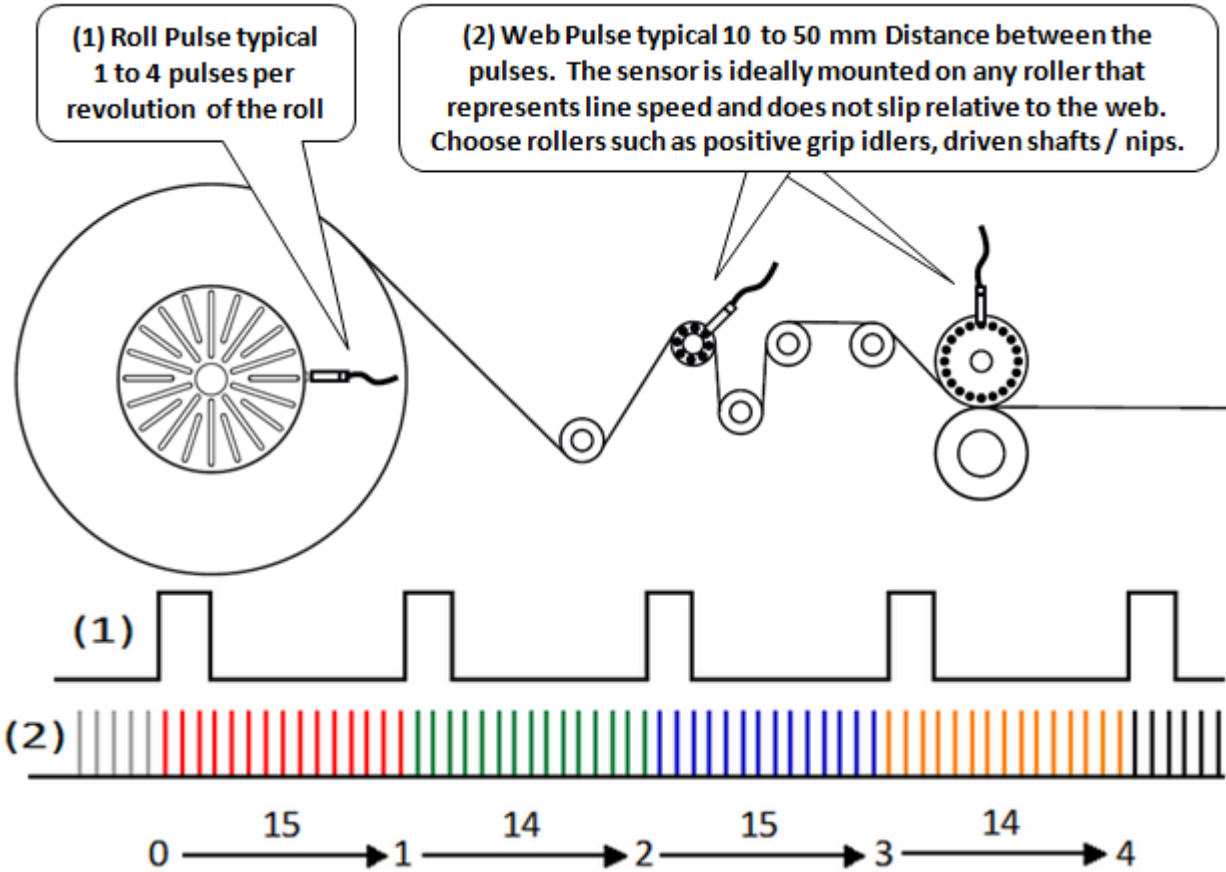
Teach      Return to the Setup screen  
 4 — No of Roll Puls      49.7mm — Web Length in Puls  
 <--Back      Press to return to OPERATOR / HOME screen

Number of pulses per brake revolution      Proximity sensor status      Calculated Web length

### 5.3.2 Diameter calculation Description

Impulse-Diameter calculation through 2 proximity switches

The roll diameter is determined by 2 proximity switches, one of which captures the roll revolutions and the other the length of material passing through (material length impulse).



- (1) The proximity switch captures 1 to 4 impulses per roll revolution.
- (2) The proximity switch captures the length of material passing through per impulse.

The recommended length of material should be between 3 and 100 mm per impulse.

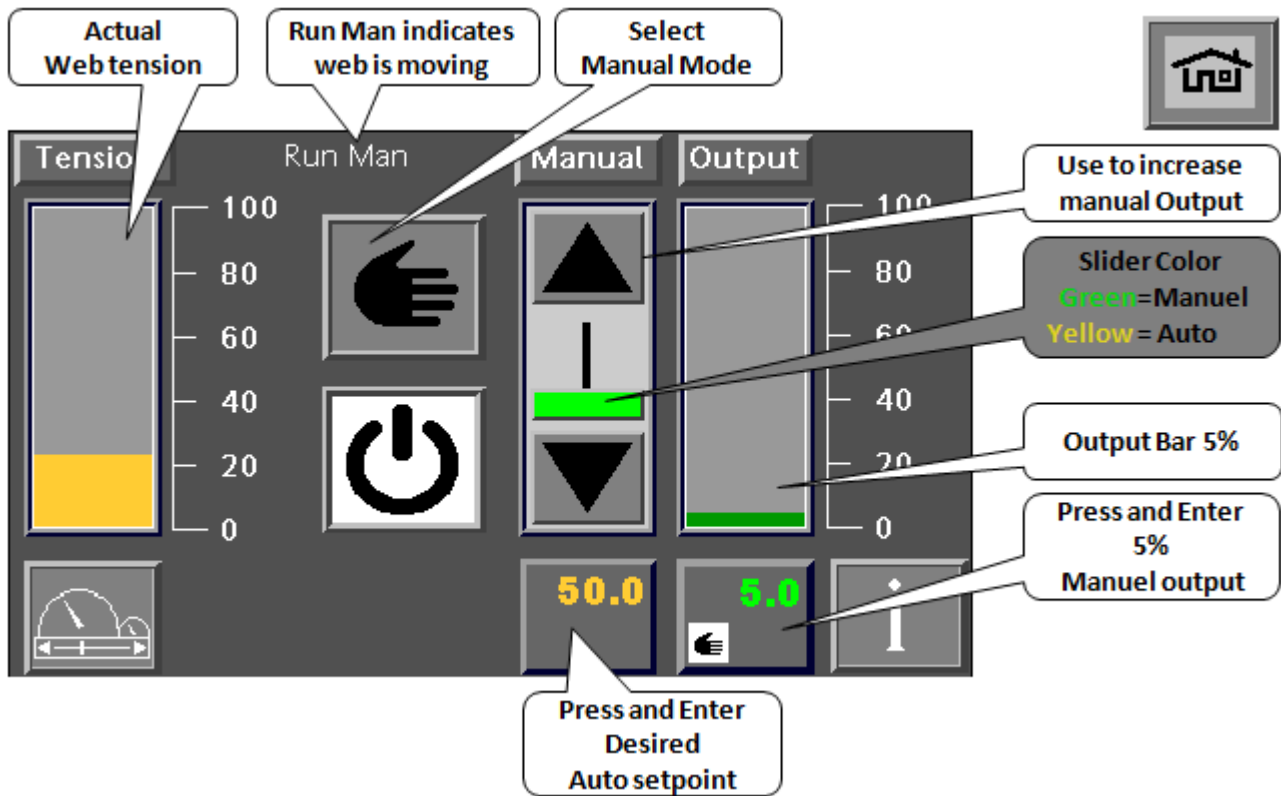
The diameter of the new roll is calculated as soon as the controller has received 2 impulses of the new roll.

Inductive sensor requirement depending on line speed



Housing	Range	Switching frequency	Design	Connection	Temperature range	Approval
M12 / L = 65 mm	3 mm	2000 Hz	M12	DC PNP (200mA)	-25...70 °C	cULus (CCC)
M12 / L = 65 mm	3 mm	4000 Hz	M12	DC PNP (200mA)	-25...70 °C	cULus (CCC)

Note: For machines faster than 600 meters/min (1800fpm), you must use a 4000 Hz sensor

## 5.4 Tuning



## 5.5 Small Roll:




1. Start with a Small roll in the machine. On the HOME screen, chose manual mode *the controller mode is **Manual*** and a 5% manual setting.
2. Run the machine at slow speed, observe that the controller mode changes to **Run Man** if the controller mode is still **Manual**, the controller is not receiving a run signal *Check wiring to the machine and make sure that the relay used for the machine Start/Stop signal is closing and opening when pressed or switched. If the switch is working but is inverted, then you will need to invert the start/stop signal (DI3) in the controller.*
3. While running the machine, adjust the Manual setpoint sliders to desired web tension
4. Enter the Auto setpoint to the desired web tension and change from  to 
5. Observe that the controller is regulating to the correct web tension. In MOST applications, *the default PI parameters in the controller will NOT need changed.*
6. Run the machine up to production speed and run the roll to the end and observe that the web tension is stable and constant within a few %. If the Tension is increasing towards the end of the roll, some additional tuning is required.

Note: the PI parameter that has the most effect on small rolls is **Min Gain**. Lower gain means it will be less responsive. Higher gain means it will be more responsive.

SEE ADDITIONAL PI TUNING SECTION FOR ASSISTANCE.



## 5.6 Large Roll:

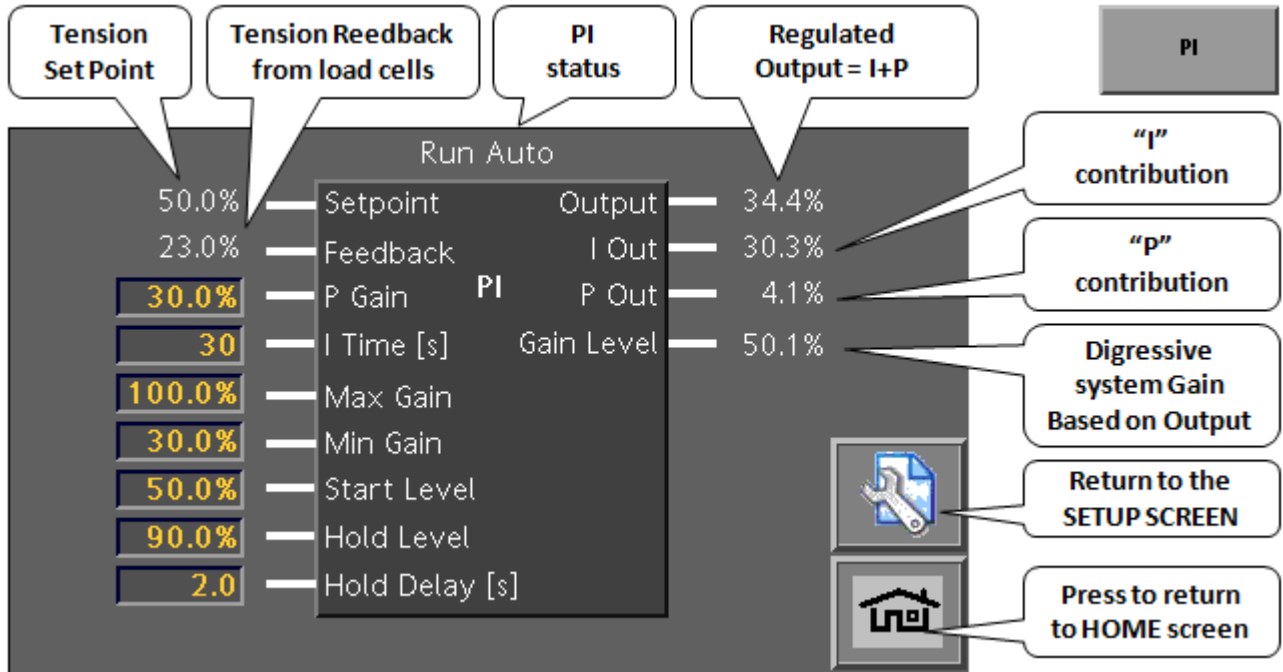
1. Keep the controller in Auto Mode  and change the roll to a large roll. Re-start the machine and turn the machine speed up and down and observe that the web tension and output is stable. *If the tension is jumping or erratic, it can be due to bad roll shape. To check to see if the roll quality is causing a problem with tension control, switch the controller from Auto  to Manual  and compare the tension variation in the 2 modes. If the tension is still erratic or jumpy, and the control output is stable (which in manual mode, the output is fixed) then the roll shape is probably causing a problem OR there is some other mechanical problem. These can sometimes be "Tuned Out" by turning the Max Gain down. Otherwise some PI parameter tuning is required.*
2. Perform Fast and auto stop of the Machine. If the web tension drops (i.e. becomes slack or drops to the floor) then consider setting up the Fast stop functions. SEE FAST STOP TUNING SECTION FOR ADDITIONAL ASSISTANCE.

Note: the PI parameter that has the most effect on large rolls is **Max Gain**. Lower gain means it will be less responsive. Higher gain means it will be more responsive.

SEE ADDITIONAL PI TUNING SECTION FOR ASSISTANCE

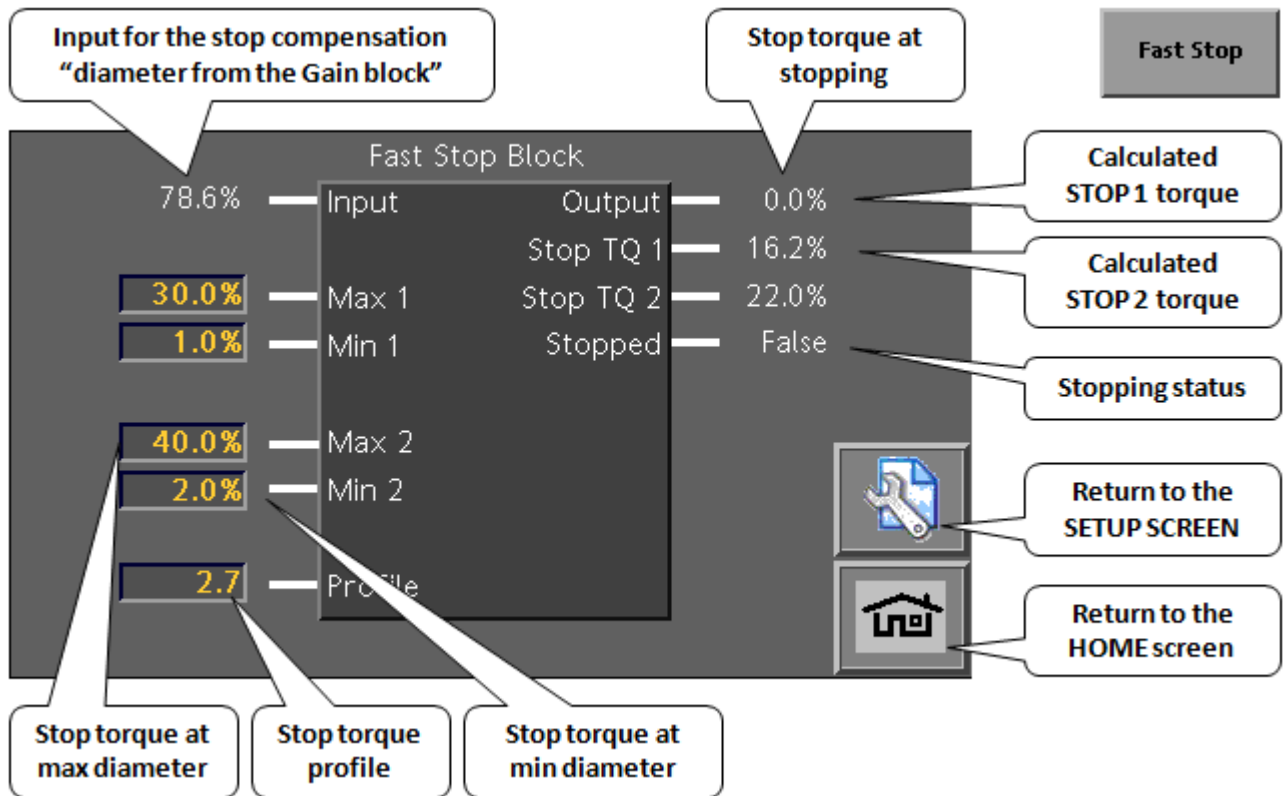
**5.7 PI**

The control algorithm uses a specially designed DYNAMIC GAIN FUNCTION that automatically takes roll size into consideration. The gain level automatically decreases or increases with roll size. The PI Regulator algorithm is specially designed for handling web tension in machines with both small and large rolls due to the digressive internal gain control.



Parameter	Description	Value
P Gain	<b>Pout= Pgain x (Setpoint-Feedback) x Gain Level</b> Adjust <b>Pgain</b> at small roll if oscillation occurs	0– 300% Default: 20 %
I Time	Integration time “Ramp time” of the regulator. If the time is too small, the output will not stabilize at large rolls; the symptom is called “waving” and is similar to oscillating but more slowly.	0 – 200 s Default: 15s
Max. Gain	This controls how fast the controller reacts at at large output. It has the most effect on <b>LARGE ROLLS</b> .	0– 300 % Default: 100%
Min. Gain	This controls how quickly the control reacts at small output. It has the most best effect on <b>SMALL ROLLS</b> . If the controller is not reacting fast enough and tension is increasing as the roll gets smaller, Increase this value. If the controller is reacting too quickly and tension is oscillating as the roll becomes smaller, Decrease this value.	0– 100% Default: 30%
Start Level	Output=Start Level*Setpoint. This is the level that the controller will start with when you start a new roll and turn “Tension Off” to “Tension On”	0– 100% Default: 50%
Hold Level	This is the level that the controller will go to when the machine is stopped. It is a percentage of the most recent output when you stopped the machine	
Hold Delay	This is the amount of time, in seconds, that the controller will wait before it goes into HOLD mode. The timer is activated when the RUN signal is removed .	0-30sec Default: 2s

## 5.8 Fast Stops



Parameter	Description	Value
Max. 1	Contribution at max. roll diameter for 'Stop 1 signal'	0.0 – 100.0 % Default: 40.0%
Min. 1	Contribution at min. roll diameter for 'Stop 1' signal'	0.0 – 100.0 % Default: 1.0%
Max. 2	Contribution at max. roll diameter for 'Stop 2' signal'	0.0 – 100.0 % Default: 80.0%
Min. 2	Contribution at min. roll diameter for 'Stop 2' signal'	0.0 – 100.0 % Default: 2.0%
Profile	Gain characteristic (max. To min. roll diameter)	– 3.0* Default: 2.7

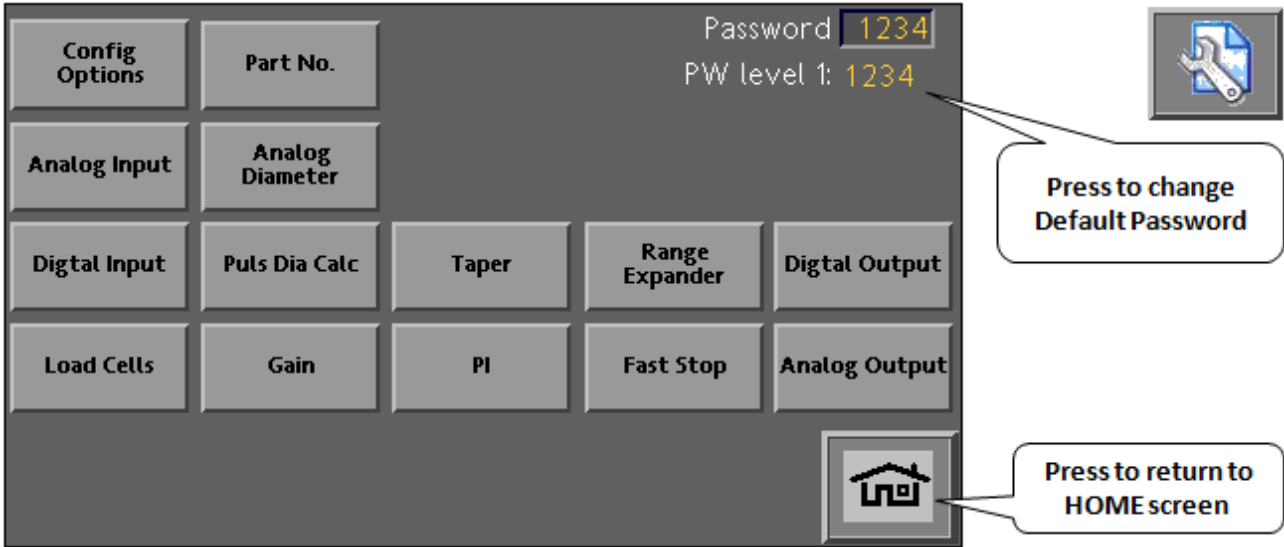
\* 1.0 = linear course of gain from max. to min. roll diameter  
 3.0 = max. progression of gain (diameter<sup>3</sup> ≈ inertia)

## 6 Parameter Menu



From the Status screen: press  to get to the general Setup screen:

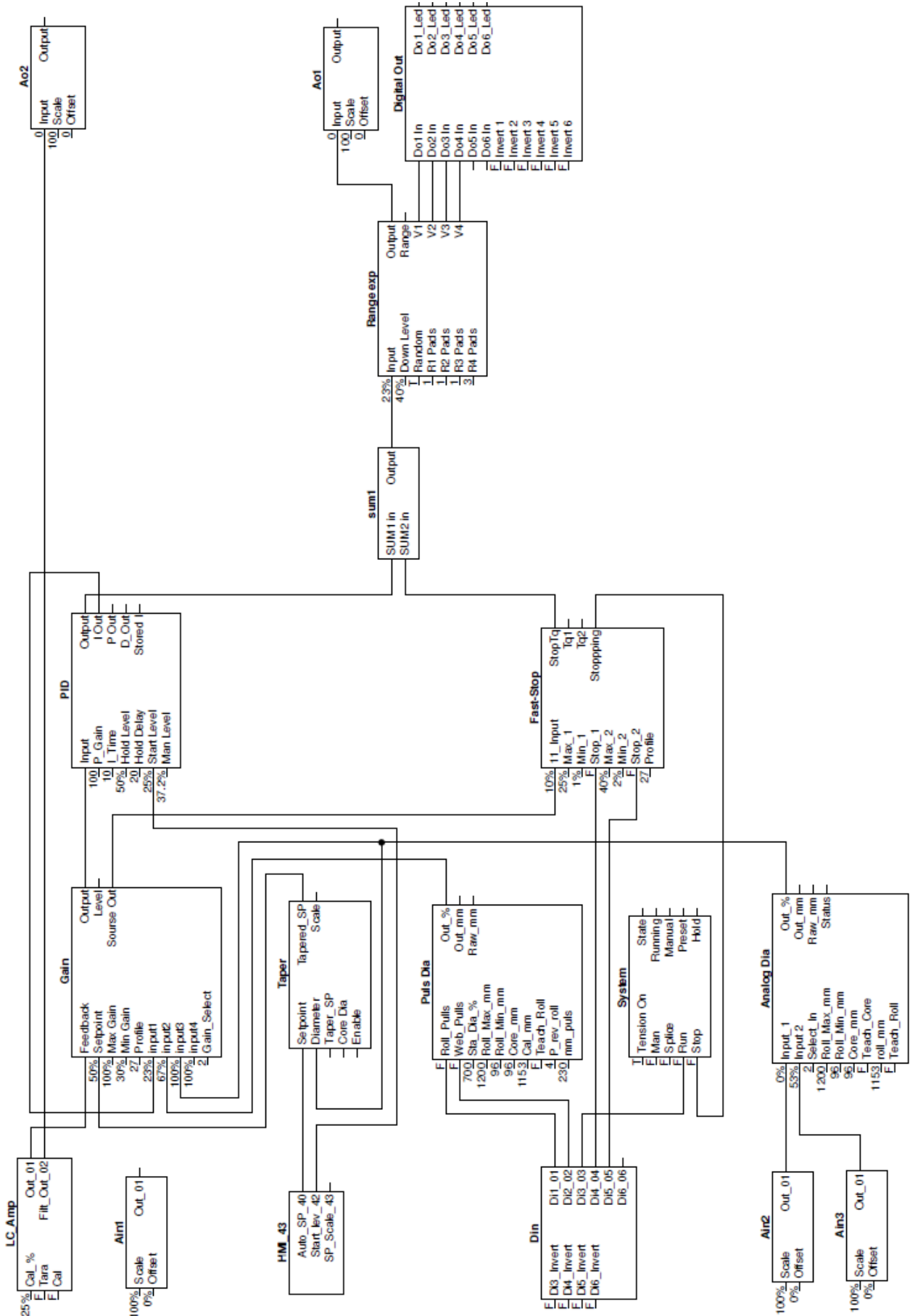
### 6.1 Setup Screen



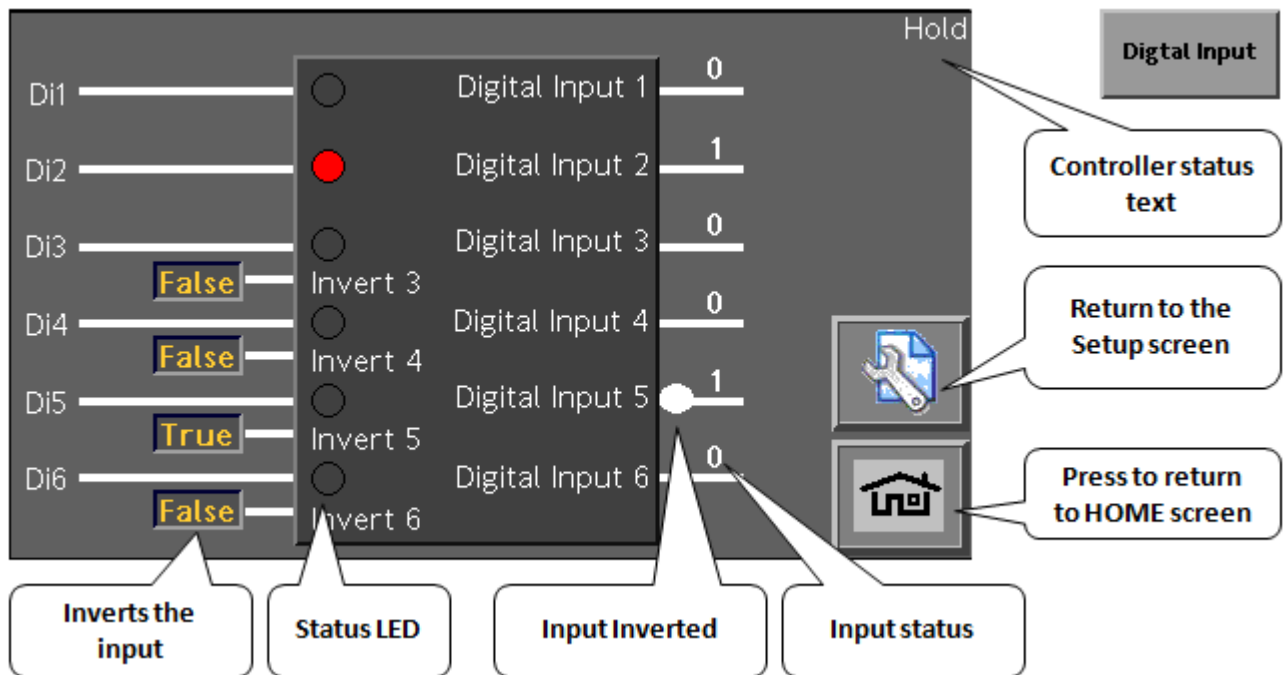
From here, you can, via the buttons, access the individual function blocks.

Note: The number of available blocks on the screen will depend of the controller configuration.

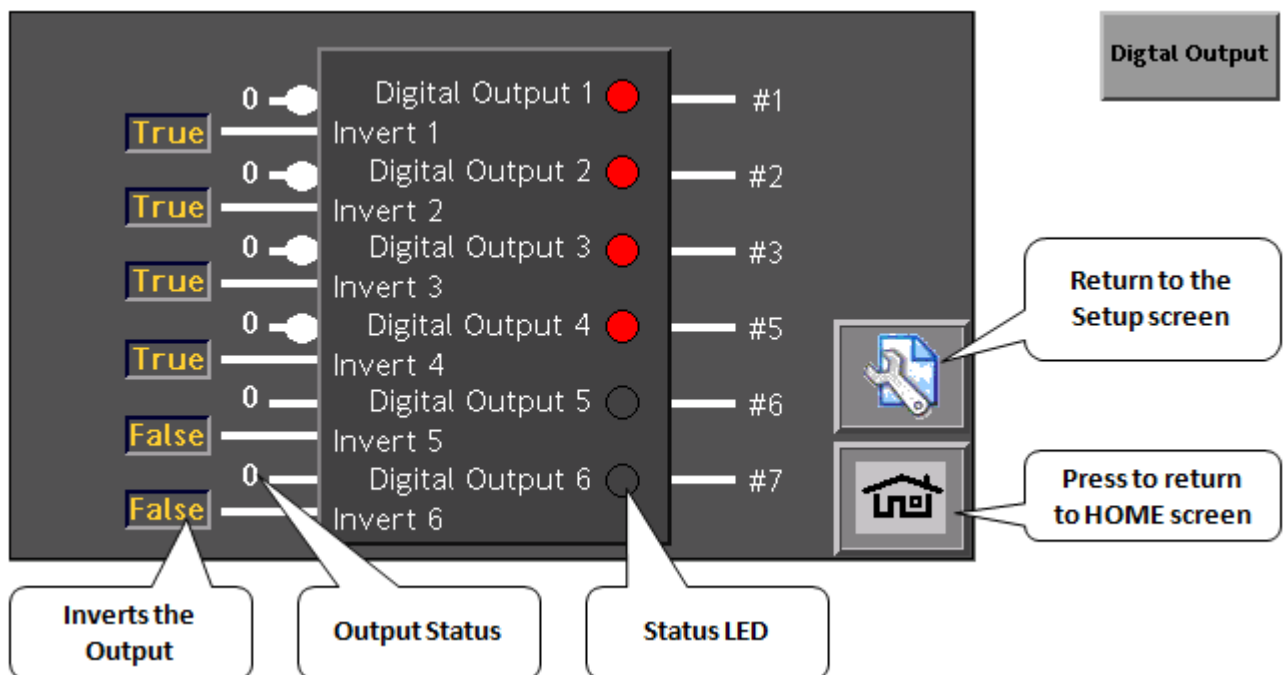
### 6.1.1 Block diagram



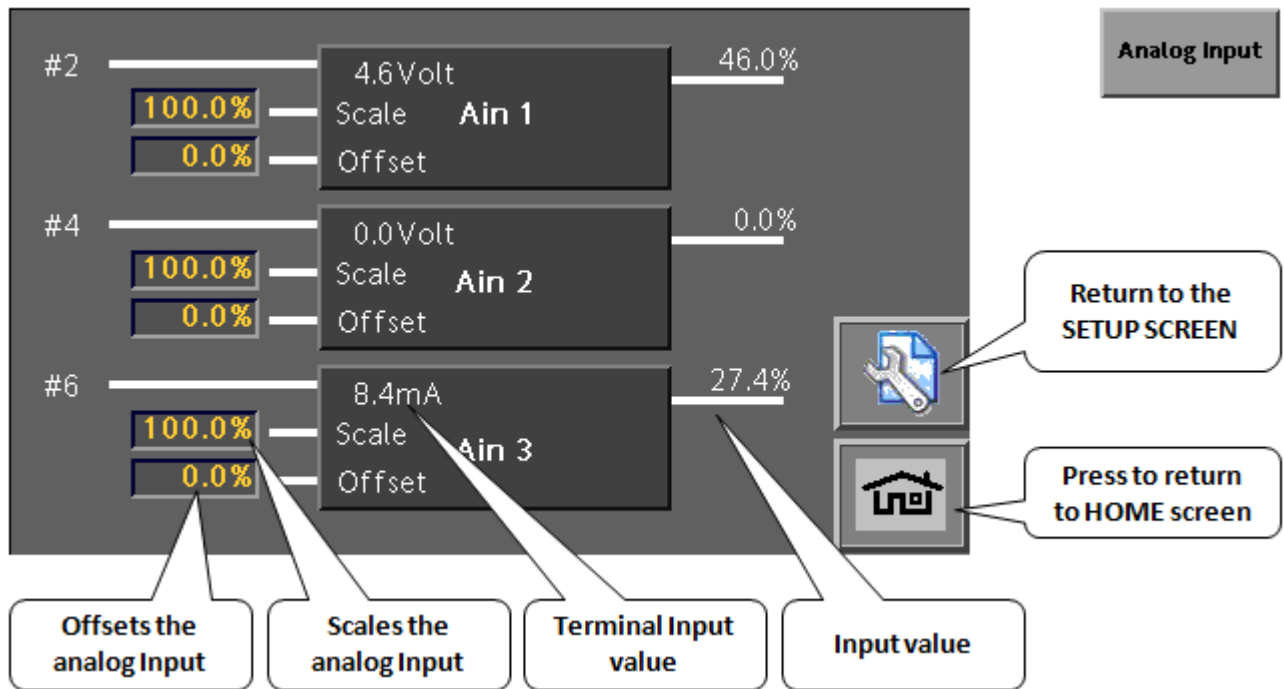
## 6.2 Digital Inputs



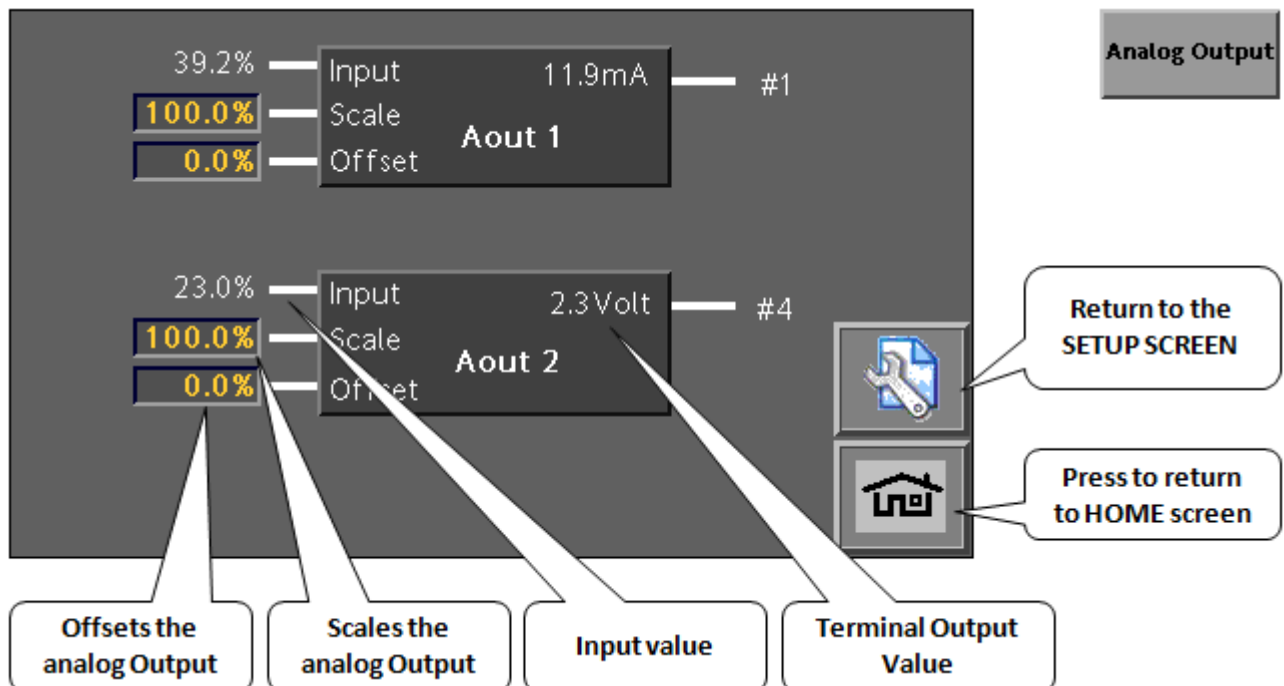
## 6.3 Digital Outputs



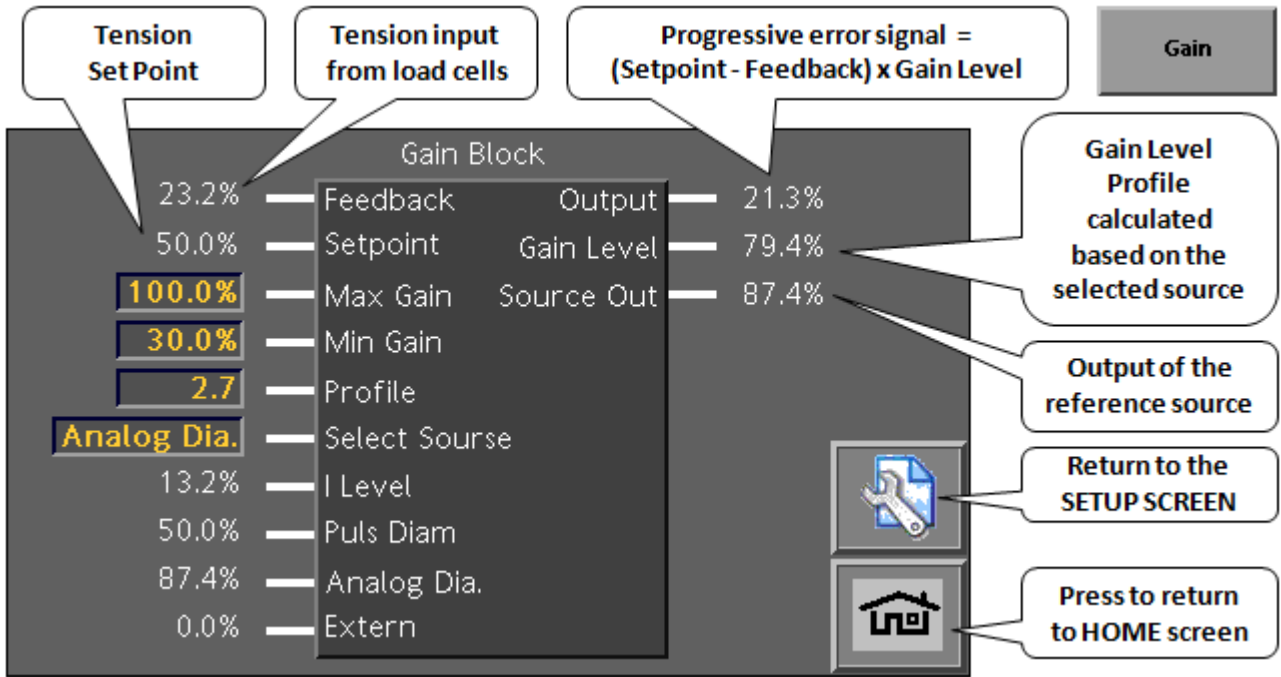
## 6.4 Analog Inputs



## 6.5 Analog outputs



**6.6 Gain setup screen**

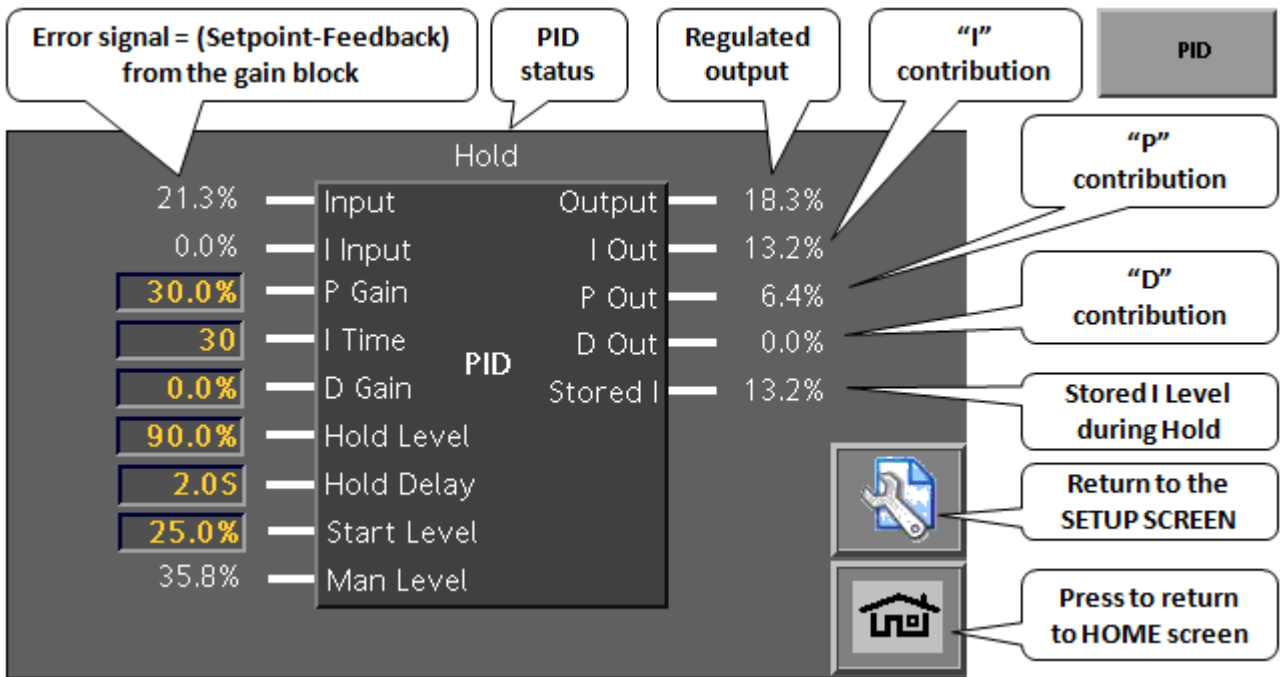


Parameter	Description	Value
Max. Gain	Gain value at max. roll diameter	- 300.0 % Default: 100.0 %
Min. Gain	Gain value at min. roll diameter	- 100.0 % Default: 30.0 %
Profile	Gain characteristic (max. To min. roll diameter)	- 3.0* Default: 1.0
Select Source	Select source of Error - Gain characteristic	1=I Level (Default) 2=Puls Dia. 3=Analog Dia. 4=Extern
I Level	Integrator level of PID controller	0.0 – 100.0 %
Puls Dia.	Calculated roll diameter through proximity switches	0.0 – 100.0 %
Analog Dia.	Measured roll diameter through Ultrasonic- / Laser-Sensor	0.0 – 100.0 %
Extern	Free input for an external source	0.0 – 100.0 %

\* 1.0 = linear course of gain from max. to min. roll diameter  
3.0 = max. progression of gain (diameter<sup>3</sup> ≈ inertia)

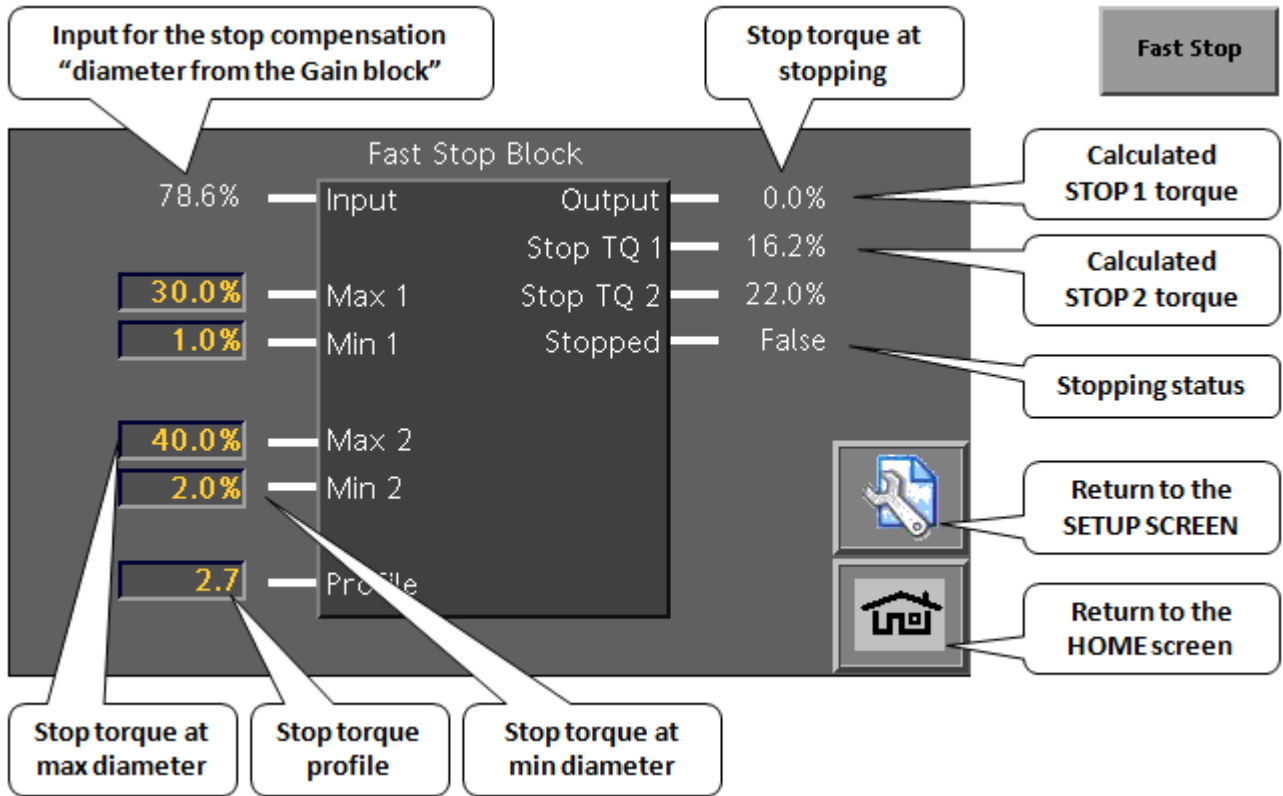


### 6.7 PID parameters setup



Parameter	Description	Value
P Gain	Gain value of P-share	0.0 – 300.0 % Default: 20 %
I Time	Re-adjustment time of I-share	0 – 200 s Default: 15 s
D Gain	Gain value of D-share	– 300.0 % Default: 0.0 %
Hold Level	Hold level of I-share (at machine standstill)	– 300.0 % Default: 90.0 %
Hold Delay		
Start Level	Start level of I-share (after roll change)	– 100.0 % Default: 25.0 %
Man Level	Manual adjustment of I-share (P + D not activ)	0.0 – 100.0 %

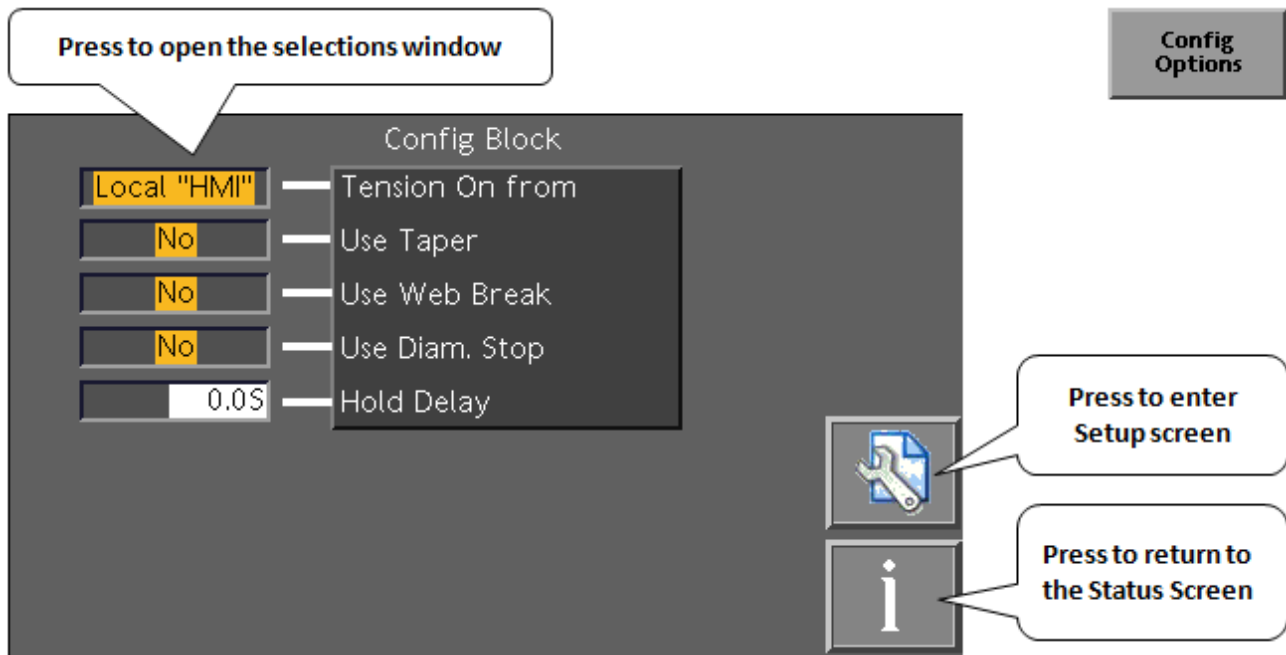
**6.8 Fast Stops**



Parameter	Description	Value
Max. 1	Contribution at max. roll diameter for 'Stop 1'	0.0 – 100.0 % Default: 40.0%
Min. 1	Contribution at min. roll diameter for 'Stop 1'	0.0 – 100.0 % Default: 1.0%
Stop 1	Activation of calculated contributory value for 'Stop 1'	False - True
Max. 2	Contribution at max. roll diameter for 'Stop 2'	0.0 – 100.0 % Default: 80.0%
Min. 2	Contribution at min. roll diameter for 'Stop 2'	0.0 – 100.0 % Default: 2.0%
Stop 2	Activation of calculated contributory value for 'Stop 2'	False - True
Profile	Gain characteristic (max. To min. roll diameter)	- 3.0* Default: 2.7

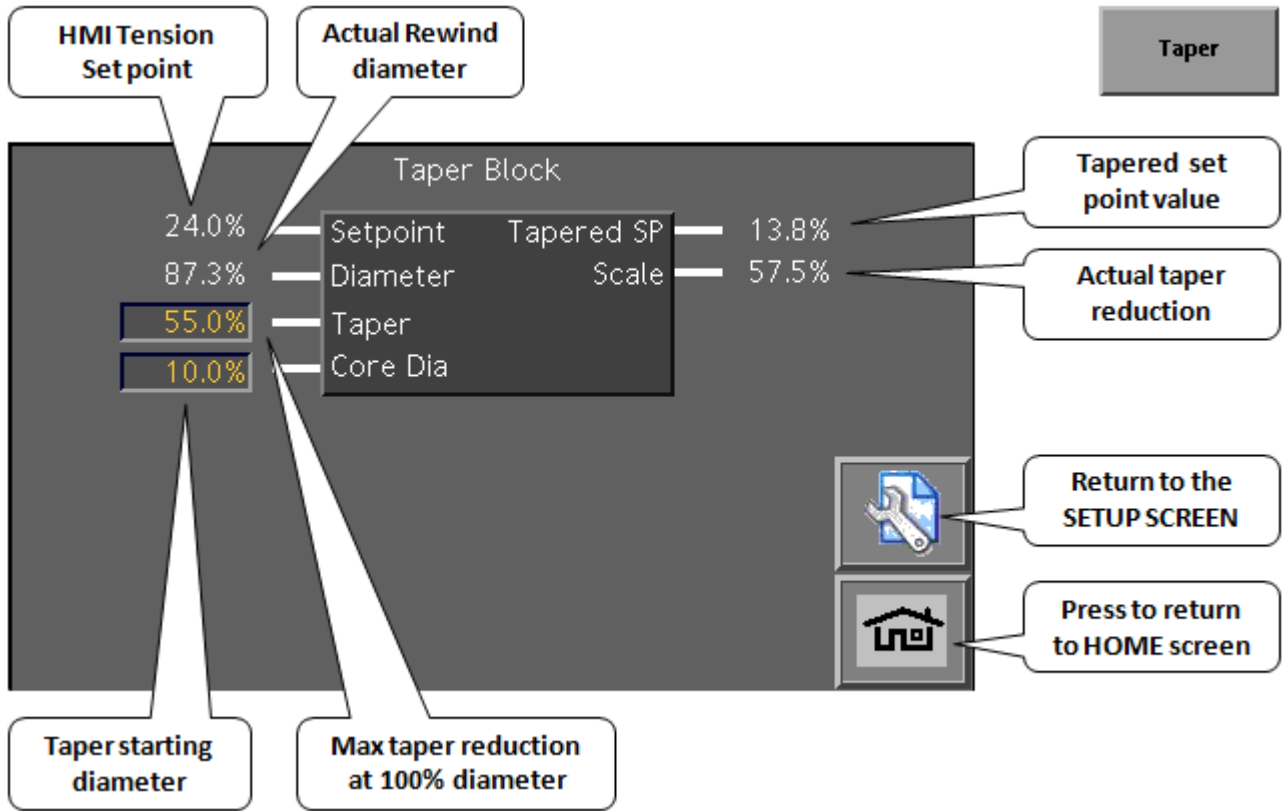
\* 1.0 = linear course of gain from max. to min. roll diameter  
3.0 = max. progression of gain (diameter<sup>3</sup> ≈ inertia)

## 6.9 Config Screen "optional functions"



Tension On From: selection HMI or Digital input 6

**6.10 Taper tension**



Parameter	Description	Value
Output	Output from Range Expander	0.0 – 100.0 %
RE State	Actual Range status	R1 - R6
Valve 1-6	Actual valve status 1-6	False - True
Input	Input from PID controller	0.0 – 100.0 %
Down Level	Threshold value for shift down of Range Expander	0.0 – 100.0 % Default: 30.0%
Randomize	Function for even wear of friction pads	False – True Default: True
Pads R1 – R6	Number of friction pads per area (R1 – R6)	0 – 12 (Default: 1)

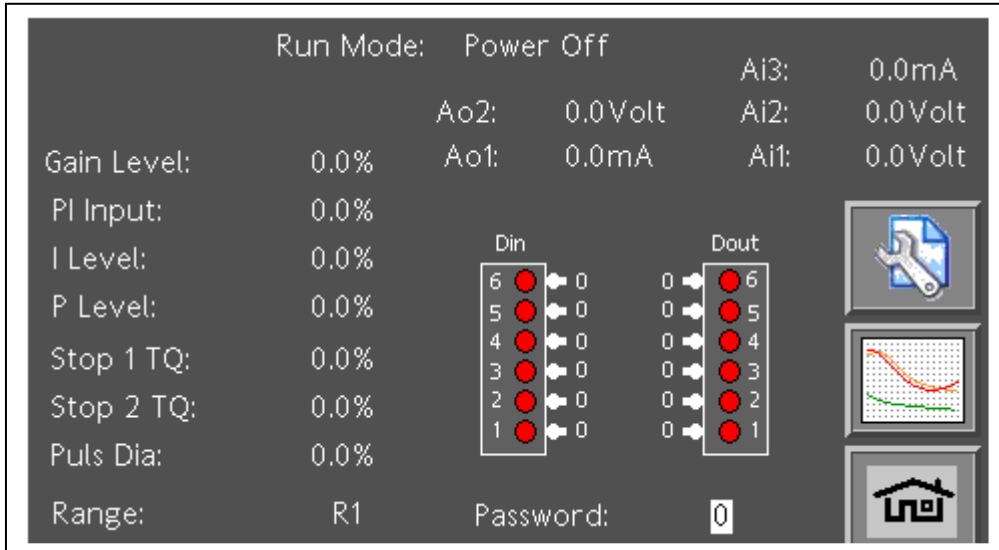
Note. The number of ranges is defined via the part number configuration

## 7 Status Screen and Chart recorder

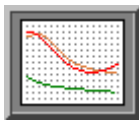
If the system experiences a power-down situation, the controller status i.e. setpoints and mode are stored. *At power on, the controller returns to the stored status.*



Use the Status page, press :

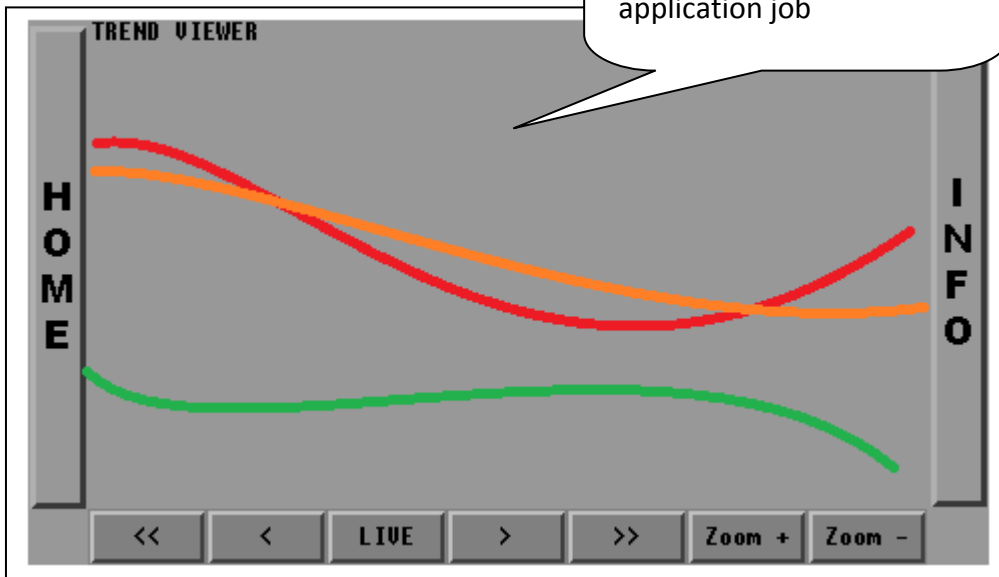


Use the built in Chart Viewer for analysis of the present running application .



Press:

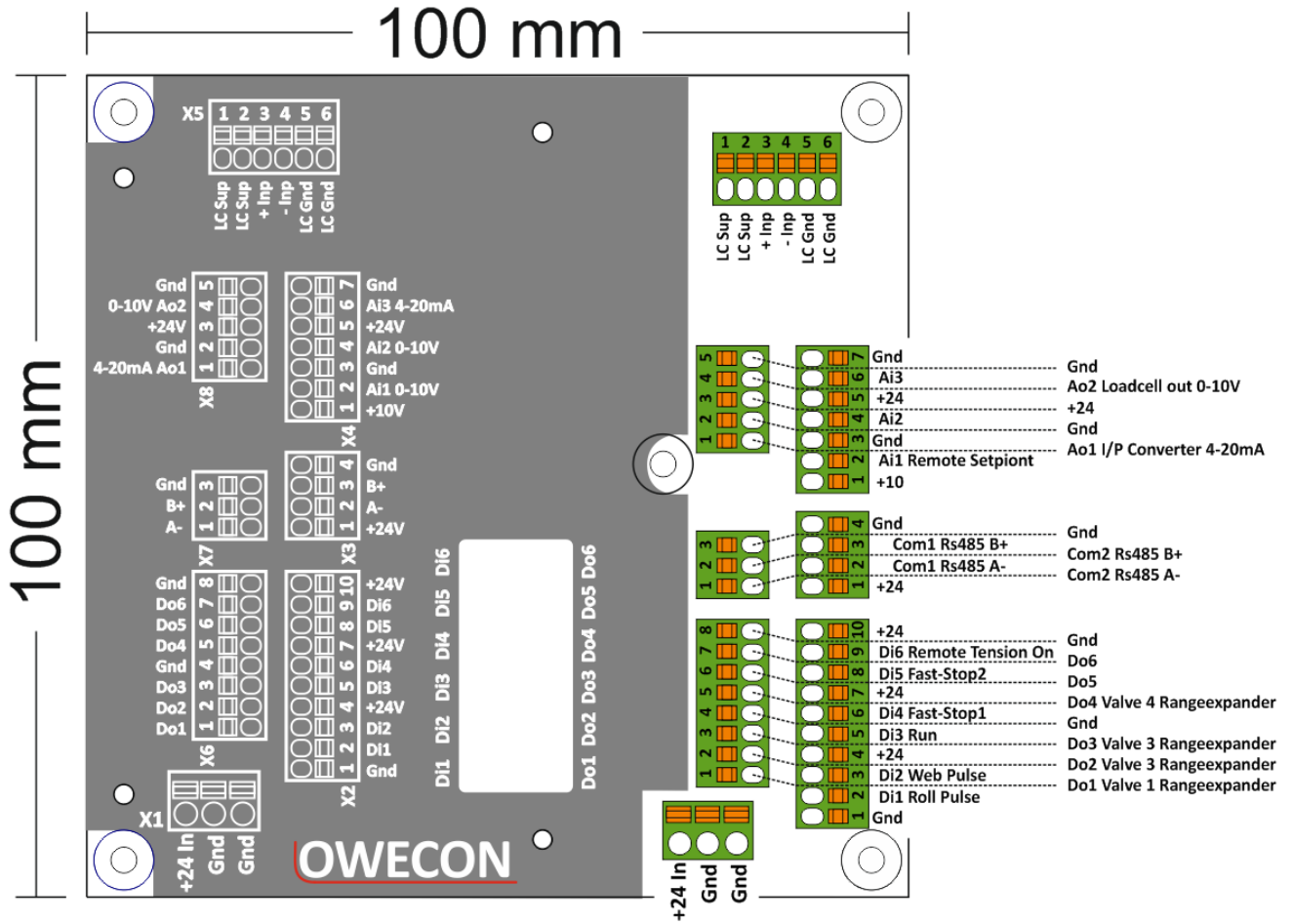
The Chart Viewer draws and saves a live picture of the signals of the present application job



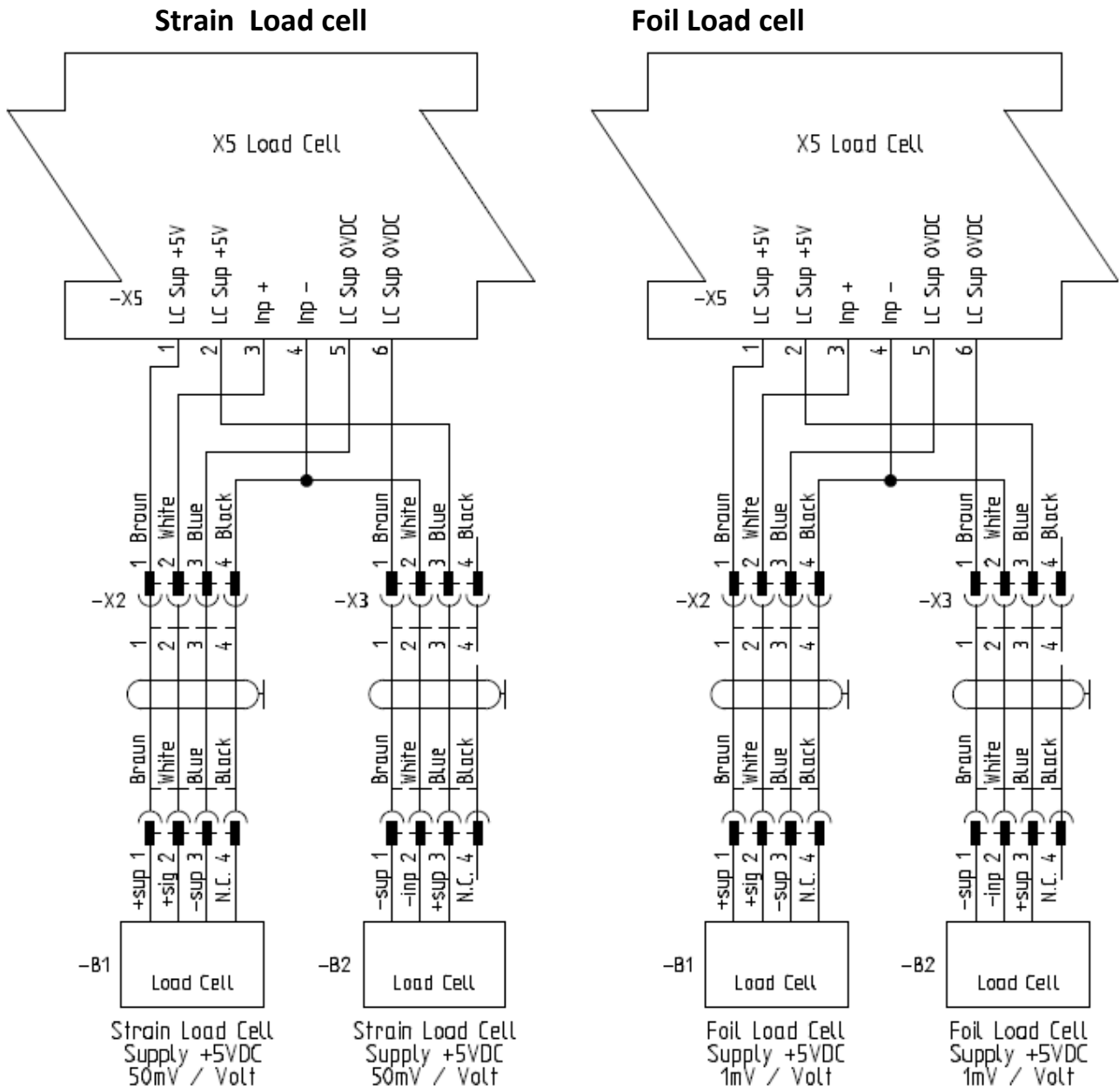
## 8 Appendix a

### 8.1 Wiring Diagrams

#### 8.1.1 PCB Controller terminals

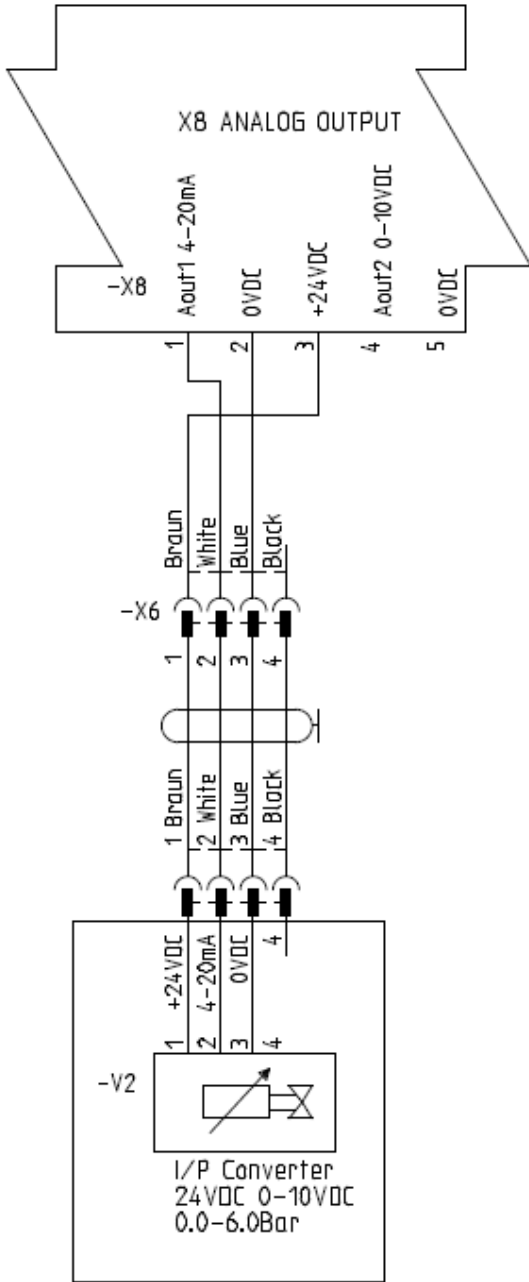


8.1.2 Load cell diagram



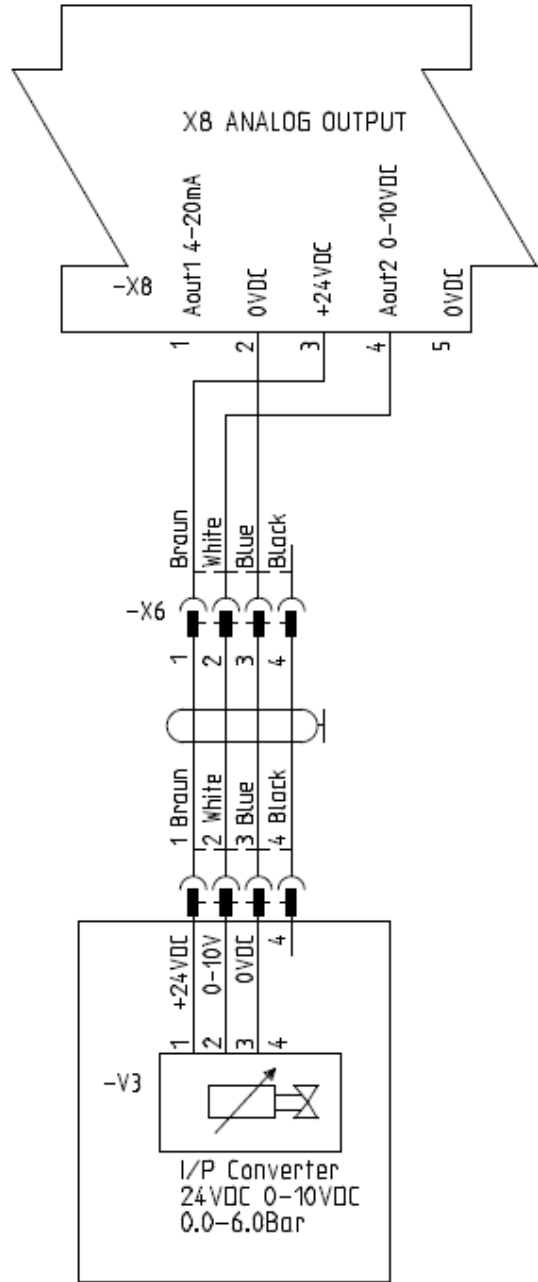
**8.1.3 IP Converter diagram**

**4-20mA Connection**



OWP220 PneuMatik box

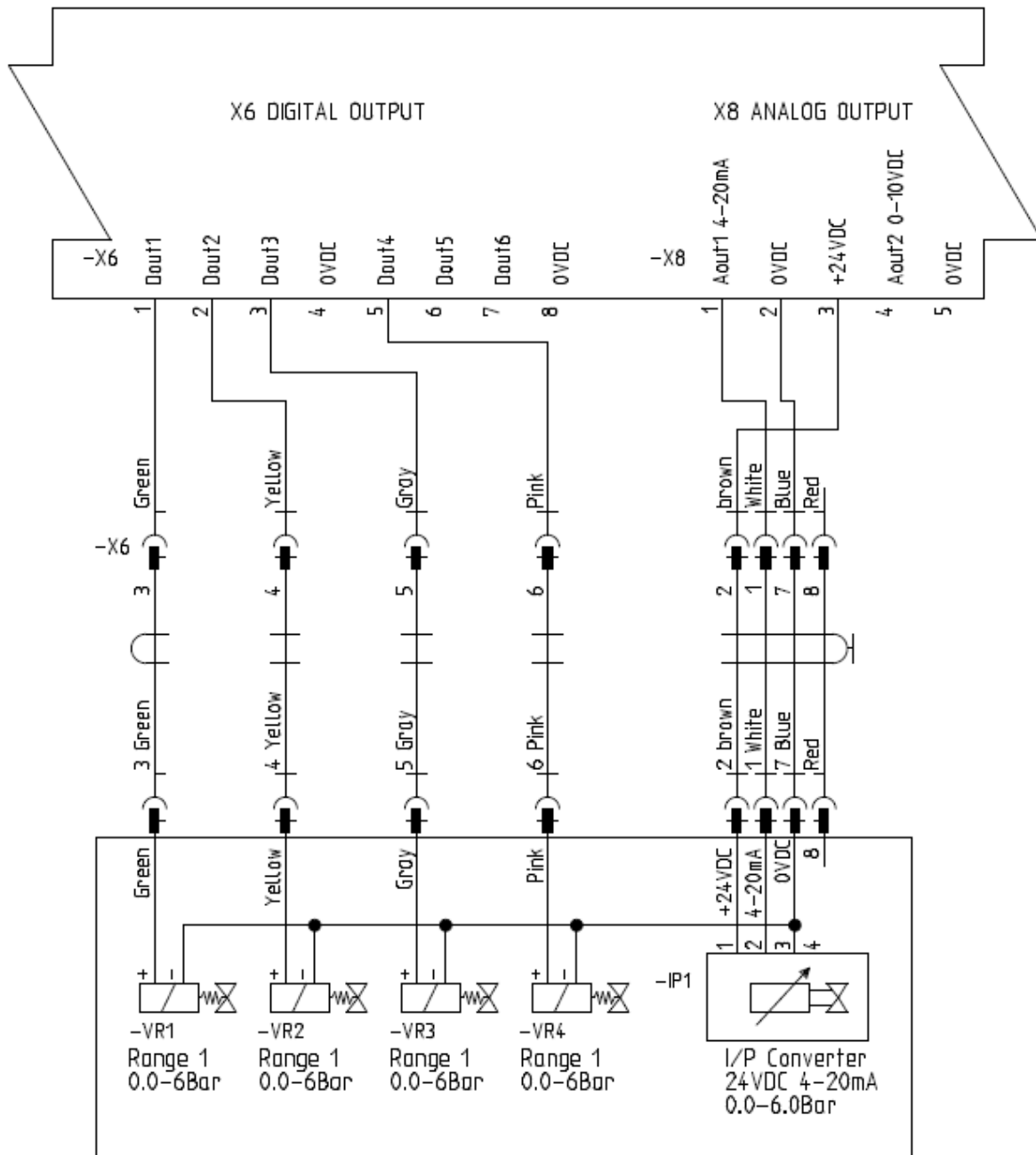
**0-10VDC Connection**



OWP220 PneuMatik box

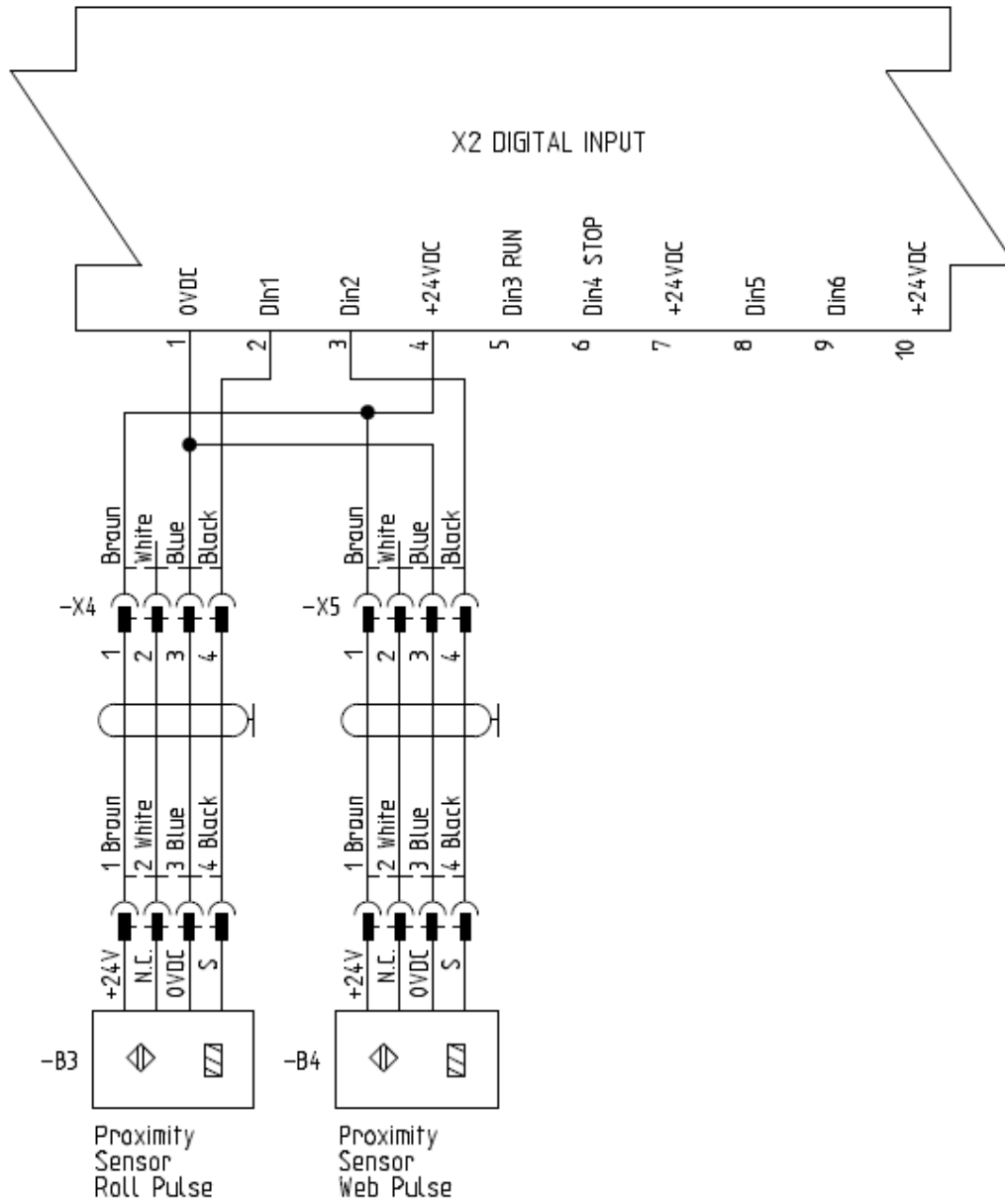


8.1.4 Range expander diagram



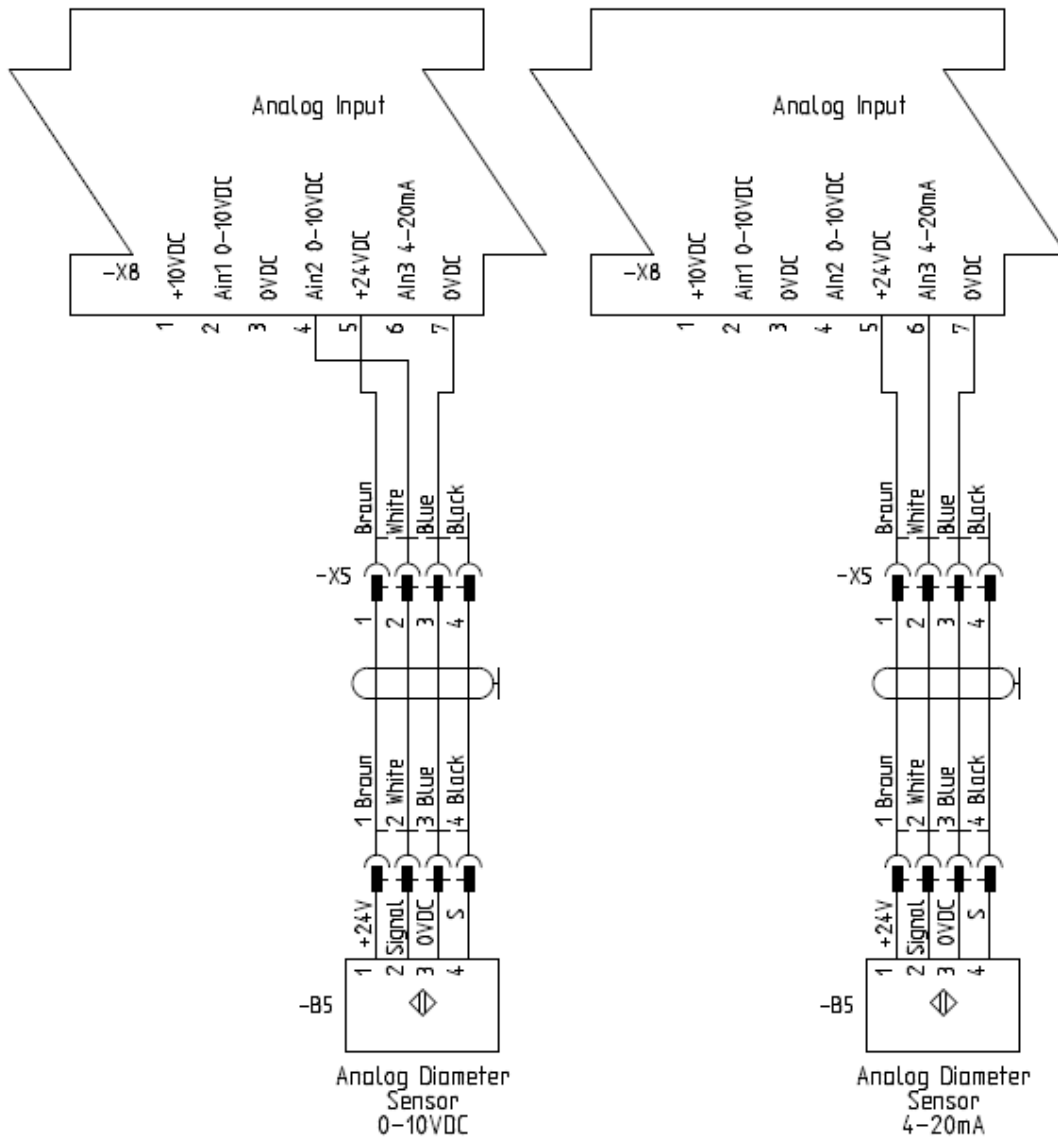
0WP224 Pneumatik box with Range valves and IP Converter

**8.1.5 Proximity sensor Puls diameter**



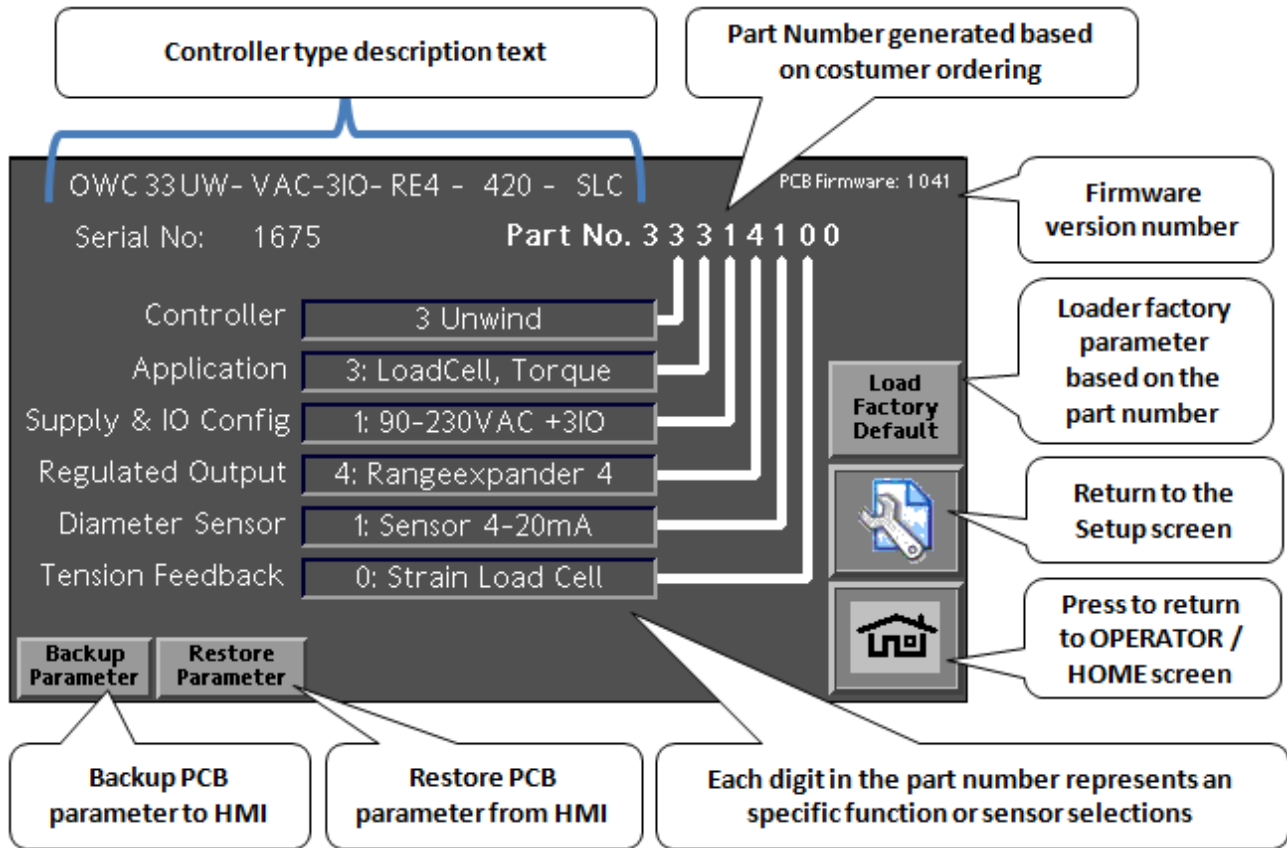
### 8.1.6 Analog Diameter Sensor

mk



## 9 Part Number and ordering info

### 9.1 Part Number Screen



The controller configuration is based on the part number to insure optimal customer configuration and spare parts handling

In case of an defective PCB or operator HMI the system is capable of re programming the components for further information contact customer service

## 9.2 Part Number Selection plan

