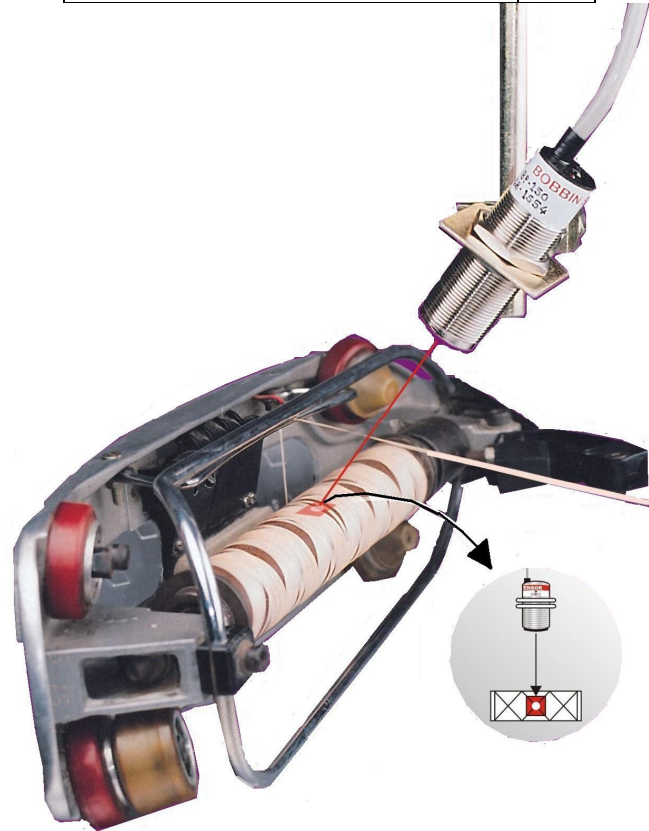


# OPERATION MANUAL

Common for All models

## Bobbin Sensor (Weft End Detection)

DP150 - L2	
BP150 - L2 - 12V	
BP150 - L2 - 24V (PNP/NPN)	



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# 1 MANUAL OF OPERATION FOR BOBBIN SENSOR (WEFT END DETECTION)

For Both Models: 1) DP150-L2 and 2) BP150-L2 (PNP / NPN)



### Introduction:

The circular Loom used in woven sack industry has 4 - 8 shuttle bobbins which provide the weft tapes to circular fabric weaving. If this tape breaks, the fabric is wasted as it contains lots of missing tapes. Our magnetic sensor has been used widely to detect

these types of breaks and avoiding the wastage of fabric. However there has been great demand for detection of near empty condition of shuttle bobbin, so that bobbin can be changed just before it is completely empty.

This results in zero defect fabric, minimum wastage of tape, and more efficient use of manpower. Usually to achieve zero defect fabric, all the shuttle bobbins are replaced at once, even if they are not empty. This results in lot of tape wastage on 'Not so empty bobbins'. Our bobbin sensor is designed to detect the near empty condition of bobbin. When the sensor detects the near empty condition of bobbin, the sensor stops the loom, so that only that particular bobbin can be changed. This not only results in Zero defects Fabric, but also almost Zero wastage on bobbins also.

**Description:** The bobbin sensor is a highly sophisticated and state of the art sensor to detect when shuttle bobbin nears empty condition. The sensor is based on Infra Red to detect the presence of tape on bobbin, and a powerful, fast microprocessor which calculates various timing and detects the near empty bobbin and sends the trip signal to Relay PCB OR Loom Controller / PLC. As the sensing mechanism is based on infra red principal, colour of shuttle bobbin tape and base colour of empty bobbin may affect the performance of sensor. However it will work faithfully on light colour tape and all mild steel bobbins (empty bobbins Blackish in colour and non-shining).

**Packing List :** After receipt of material, check for all items as indicated in 'Packing List'.

**Bobbin sensor of DP150-L2 OR BP150-L2 (PNP or NPN) can be fitted on any type of loom namely 4 shuttle, 6 shuttle, 8 shuttle etc. 'L2 model have red focus light for easy setting and accurate focusing'.**

**SELF TEST:** A feature is added to check tripping circuit of bobbin sensor and LEDs. On every power ON to bobbin sensor, the LED flashing sequence will be white LED ON, then Red LED ON and then white LED ON again, This flashing on power ON indicates that sensor is working and while the Red LED is ON for a short time, in effect the input on loom controller / PLC will be also ON at that moment **OR** the Relay on Relay PCB will be also ON at that moment. This is the '**self test**' by bobbin sensor where it checks both the LEDs, and the output connection of sensor up to Relay PCB OR the loom controller / PLC.

**Bobbin Sensor Models: For Weft End detection.**

**1) Universal Type 12V DC Model with Relay PCB: This combination can fit on all types of Looms:**

**12V DC sensor (DP150-L2) is connected to Relay PCB.** The Relay contacts (COM, NO and NC) are used to STOP the loom. For Mechanical Loom connect the Relay contacts to STOP the loom by opening the Common and NC contact connected in series of STOP Push Button wiring. It can also be connected as 24V DC PNP or NPN output type using Relay contacts to the Loom Controller / PLC.

**Please refer to Electrical Connection Schematic provided.**

**Electrical Connections:** PLEASE CHECK THE COLOUR CODE.

**DP150-L2:** Connect Sensor directly to Relay PCB as follows. Connect Relay contacts to STOP loom.

Sensor Model	Sensor Connections as per the colour code				Drawing
<b>12V DC Sensor DP150-L2</b>	<b>Connection</b>	<b>- 0V DC</b>	<b>Signal</b>	<b>+12V DC</b>	<b>Refer to Connection Diagram of DP150-L2</b>
	Wire Colour Code	Blue BU	Black BK	Brown BN	

**2) Direct 24V DC Model (BP150-L2): Suitable for direct connection on specific looms: Relay PCB is avoided.**

**24V DC sensor (PNP or NPN)** is directly connected to loom controller or PLC Please refer to wiring diagram. The output gets activated when Stop Signal is sent by sensor. The loom controller or PLC will STOP the loom on receiving this signal from sensor.

**Please refer to Electrical Connection Schematic provided.**

**Electrical Connections:** PLEASE CHECK THE COLOUR CODE.

**BP150-L2-24 (PNP or NPN):** Provide 24V DC Supply to sensor as follows. The Signal is directly connected to Loom Controller / PLC which will then STOP the loom.

Sensor Model	Sensor Connections as per the colour code				Drawing
<b>24V DC Sensor BP150-L2-24 PNP / NPN</b>	<b>Connection</b>	<b>- 0V DC</b>	<b>Signal</b>	<b>+ 24V DC</b>	<b>Refer to Connection Diagram of BP150-L2-24 (PNP / NPN)</b>
	Wire Colour Code	Blue BU	Black BK	Brown BN	

**Note: Connect Supply wires and output in correct Polarity. Otherwise sensor will not work. Consider change in color code.**

**Sensor Installation: focusing, setting, mechanical fitting and working trial of sensor:**

Different looms may require different types of clamp set. We can supply a commonly required "L" Type three piece Clamp Set.

Install the universal joint on 20 mm Ring support rod. Ensure that this joint is in horizontal position.

**(Note : For loom manufacturer and woven sack factories, we strongly recommend to use semi fixed type clamp design for Bobbin sensor, so that whenever fabric size changes, re - setting of sensor clamp is not required.). Please see the photo of the semi fixed type clamp.**

Avoid sharp bending of cable coming out of sensor. Provide sufficient bending curve. Please dress up the cable properly to avoid any damage to cable.

**Sensor to Empty Bobbin Distance and Gap between Tapes:**

- 1) **Set the distance** from sensor front to empty bobbin about 125mm (minimum 120 mm and maximum 150 mm). The sensor must be firmly fitted on the clamp set.
- 2) **Warp tapes should not interfere sensor focus.** (Focus between the Warp Tape gap) If less gap, reduce sensor distance and the angle more vertical to find more Gap. Use POT for setting. Take care of this for accurate performance of bobbin sensor.

FIG. 1

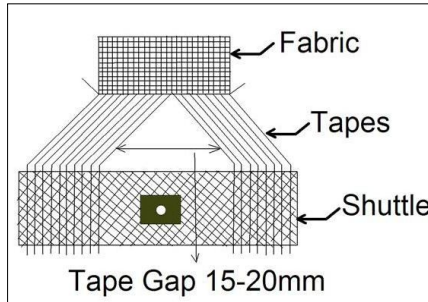
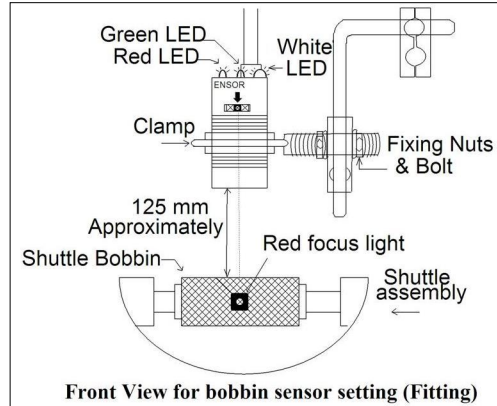


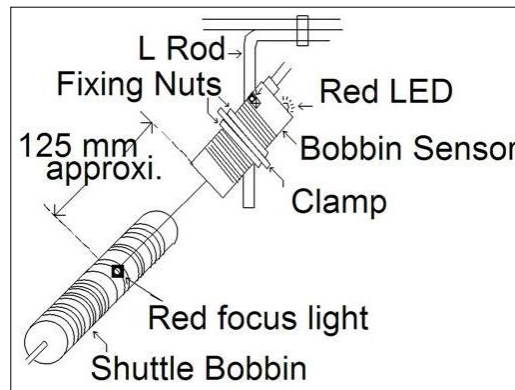
FIG. 3



**Angle and Focus :**

It is most important that **sensor should focus towards center of bobbin** at an angle of 45 degree approximately, and **not interfering any other shuttle**

FIG. 2



**Rods.** For setting, use bobbin with minimum tape. RED focus LED in L2 version is very useful and it will help for the accurate focusing at axial center of shuttle bobbin. The sensor should focus towards the bobbin through the warp tape gap and then set the sensor with 'arrow mark' on the sticker points towards the shuttle bobbin as shown in the diagram. After the setting of Distance, Angle and focus, then firmly tighten all the nut bolts of the clamp set and ensure finally that

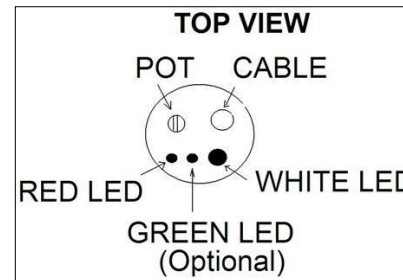
the focusing is accurate.

**Final setting and working trial:** 1) Once the Physical distance of about 125mm is set, further setting of bobbin sensor is done by POT, if required. This may be also required when colour of shuttle tape is changed. Put all shuttle bobbins with minimum tape and then set the sensor by Pot as follows: While shuttle is under bobbin, rotate pot anticlockwise so that White LED becomes off. Then rotate it in clockwise direction slowly, so that, White LED just gets ON. Then rotate pot by 2 more turns and keep it like that.

2) **Put small bobbin** (2-3mm of tape) on all shuttles. Bring each bobbin under the sensor by 'Inching' and check White LED on sensor lights up (Check that on empty bobbin white LED is OFF). Also check red focus on all shuttle bobbins is focused correctly at center. Once all bobbins are sensed, RUN the loom and then the White LED on sensor will light up continuously after 2-3 rotations of loom. White LED continuously ON while Running Loom indicates that all shuttles are sensed correctly. Run the loom continuously.

3) **When any Bobbin gets near empty**, (Pipe and tape both visible) the White LED will start flashing for 2-3 Rotations of loom and then STOP signal is generated to stop the loom. RED LED on sensor will light up for 4 second indicating that stop signal is generated.

Replace the bobbin with normal size bobbin and then one by one check for all bobbins. The sensor should stop loom on each bobbin one by one, when they are in near empty condition respectively. Properly set sensor should not sense the near empty 'bobbin' (white LED off) If the sensor is not set properly



on the bobbins, and you try to run the loom, White LED will keep flashing and after 2-3 rotations, the loom is stopped again on repeated attempts to RUN the loom. This feature is added specially to indicate some problem in sensor operation. **Reasons can be :** a) any of the bobbin is not sensed, b) Distance setting problem, c) Angle and focus not set correctly, d) Shuttle pad or shuttle steel

rod sensed, e) Side white pads comes on bobbin with less Tape when loom is Running. Please check it carefully, identify the problem and solve the problem.

When loom stops due to weft end fault condition, the Red LED will be on for 4 seconds indicating that Loom has stopped due to weft end. The stop signal is activated on Signal Output wire for 2 second.

Now your sensor is ready for operation and it will stop the loom faithfully, when any of the weft bobbins goes to near empty condition. In case the loom does not stop when the bobbin is near empty, go to troubleshoot section.

**LED Indications:****LEDs on RELAY PCB: (Used with DP150-L2)**

**Red LED:-** This LED will light up for about 2 seconds when the sensor detects near empty bobbin and generates a STOP signal (on Signal Output wire). Normally this LED should be off while loom is running.

**Green LED: -** This LED indicates that 24V AC supply is coming and 12V DC is present. Normally GREEN LED should be always ON while 24V AC power supply is ON.

**LEDs on SENSOR: For Both Models DP150-L2 and BP150-L2 (PNP or NPN)** There are two LEDs on the bobbin sensor (3<sup>rd</sup> LED is optional and not required). The functions of these LEDs are described as below:

**White LED: -** This LED lights up when a bobbin is under the sensor and it is sensed. (When bobbin comes under sensor, this LED lights up) During normal operation when loom is running, this LED will be ON continuously indicating that all the shuttles are sensed and no shuttle is near empty. If the white LED flashes while loom is running, it indicates that one of the bobbins is not sensed or it is near empty. In this condition a stop signal will be generated by bobbin sensor and loom will be stopped. If this is not the case please refer to troubleshooting section.

**Red LED: -** During normal loom running condition, when white LED is ON, and if any of the bobbins is in near empty condition, this LED will be ON briefly for approximately 4 seconds and will stop the loom by giving signal to loom controller / PLC **OR** Relay PCB. The loom should stop immediately after the stop signal is generated. If loom do not stop please refer to troubleshooting section.

**Green LED (Optional):-** If provided, Green LED lights up when a bobbin is under the sensor and it is sensed. Bobbin sensing is also provided in white LED (Green LED is optional and was there previously. Now it is removed because not required).

**TROUBLE SHOOTING (Fault finding):** If sensor is not working properly, check all the things as mentioned in **Sensor Installation**. Also check all electrical connections and refer below mentioned point for trouble shooting. When the sensor fails to detect the near empty bobbin, kindly refer following for fault diagnosis. In case still the problem is not solved, please contact us. By comparison with any other sensor, if you find that sensor faulty, please inform and according sends back to us for checking.

**Loom stops before bobbin is near empty: (Early tripping):** Check dust on acrylic front side. Clean it. Avoid scratches on it. Increase the sensing distance by rotating the POT on Bobbin sensor clockwise by a turn and check again. Repeat if required. When Colour of Tape is changed, the sensing distance setting by "POT setting" is required.

**Loom does not stop even if bobbin is near empty: (Late tripping):**

Decrease the sensing distance by rotating the POT on Bobbin sensor anti-clockwise by a turn and check again. Repeat if required. When colour of Tape is changed, the sensing distance setting by "POT setting" is required.

Check if the warp tape interferes the focus of Bobbin sensor. Create gap between the warp tapes where the sensor is focused. Refer to the figure.

**Loom stops every time within 2-3 rotations after Start command:** Check if any bobbin is near empty condition. Check if all bobbins are sensed properly. If all bobbins are sensed properly, white LED should glow continuously. Set sensor again properly.

**White LED on Sensor does not light up when bobbin comes under it:**

Clean the sensor front acrylic by cleaning cloth. Avoid scratches on it.

Set the distances between sensor and blank bobbin to approx. 125mm or so as required as per tape colour and focus it correctly to the center of bobbin. Sensor should be tightened firmly. Further setting can be done using "Pot" provided. Please refer to **Sensor Installation**.

**White LED does not light up continuously after loom started and Stops the loom every time the loom is started:**

One of bobbin is near empty or empty. Sensor setting may be disturbed. Set the sensor again properly as per the procedure.

**No LED light up on sensor:**

**For 12V DC model DP150-L2:** Check sensor connections to relay PCB. Then check if 24V AC is coming on Relay PCB. If 24V AC Input is ok, then check fuse and 12V DC output.

**For 24V DC model BP150-L2 (PNP or NPN):** Check if 24V DC is coming to sensor. If 24V DC Input is ok then check cable.

**Red LED light up when bobbin is near empty, but Loom does not stop:**

**FOR 12V DC model DP150-L2:** Check cable connection from sensor to Relay PCB. Specifically check voltage on Signal output wire (around 9V DC), when Red LED lights up. Check if Relay operates properly and it's contacts are ok. Also check relay contact wiring. If problem is in sensor, replace it. If Relay PCB has problem, replace it.

**For 24V DC model BP150-L2 (PNP or NPN):** Check cable connection from sensor to loom controller or PLC. Specifically check voltage on Signal output wire, when Red LED lights up. (For PNP: around 22V DC and for NPN: around 0V DC). Check if loom controller or PLC input is working ok.

If problem is in cable connection, identify it and rectify it. If problem is in sensor, replace it.

**Precautions and Maintenance:** With following precautions and maintenance, bobbin sensor will give trouble free service for years.

**Take care to adjust the distance approximately 125mm, around 45° angle, focused at bobbin center axis, between the gap in warp tapes and firmly fitted.**

- Check that Red focus light accurately focused on axial center at bobbin.
- Check all electrical connections. They must be tight. Also check cable for any damage.
- **Clean the front acrylic periodically once in 4 hours or as required.** (It depends on how much and how fast dust is generated) Avoid scratches on front acrylic while cleaning.
- White LED should be continuously 'ON' when Loom is running and no bobbin is in empty condition.
- Use tube lights only, for loom lighting.
- Avoid aluminum or shining bobbins.
- Empty bobbins should be of dark brownish, blackish or with black mat coating.
- The Sensor may not function properly with dark colour tape. It will not work with black Tape.
- Do not drop diesel or oil on sensor, do not stick tape on front acrylic face of sensor.
- To avoid frequent setting on fabric size change, you may design your own fixed type Clamp.
- Check focus and mechanically tight fitting of sensor and clamp.
- Clean the dust deposited on shuttle ends to avoid false detection. (Clean the loom regularly).
- Ensure that 15mm Gap between warp tapes for proper focusing of sensor.
- **Avoid direct sun light falling on shuttle bobbin where sensor is fitted.**
- For different colours of bobbin tape, you may need to set distance using POT provided on sensor.
- Shining shuttle parts coming under sensor focus light should be blackened.
- With respect to Bobbin sensor, shuttle and loom should not vibrate excessively.

**For 12V DC Sensor (DP150-L2):** Do not connect output of sensor to any other PCB. This may damage electronics inside the sensor. Our sensor is designed for our relay board only. In case you wish to use any other card, please take prior permission from our service department.

**Note:** While ordering, please mention the model number or type as per your actual requirement. Sensor comes with other accessories like sensor clamp etc. Check which items you want along with sensor.



Suggested semi-fixed Type Clamp Arrangement : There are three options for Bobbin Sensor Clamp Arrangement.

**1) Fully settable 2) Completely fixed type OR 3) Semi-fixed**

**Fully settable clamp:** These clamps need resetting whenever fabric size changes.

**Completely fixed type clamp:** with this clamp, it may not be possible to align sensor focus exactly between the tape gap.

This specially happens when warp tapes are more and then accurate focusing between the tap gap is more important.

**Semi-fixed type clamp:** This type of clamp take advantages of both above types. With semi-fixed type of clamp, it is possible to align and focus accurately between the warp tape gaps, and resetting is not required when fabric size changes. With different models and make of loom, this clamp arrangement will need changes accordingly.

**Watch Bobbin Sensor Videos on:** [www.youtube.com/user/wovensack](http://www.youtube.com/user/wovensack)

For more details please contact us on [betacongp@gmail.com](mailto:betacongp@gmail.com)

OR call on 0712-2227125, 2240122

**For emergency services please call on**

Mobile: + 91 9763711367

Document No. WE – 8a

**Updated on: 05/04/2017**

## Technical Specifications of Bobbin Sensor And other accessories:

SENSOR	DP150-L2	BP150-L2 (24V DC)
Outer Diameter	30mm	30mm
Length	53mm	87mm
Weight	207gm	210gm
Operating Voltage	12V DC	24V DC
Output type	PNP	PNP/NPN as required.
Current	40mA	
Cable length	2 meter with connector	
Type of Sensing	Infra Red	
Sensing Distance	150mm maximum	
Maximum PPM	1500 PPM	
Minimum PPM	300 PPM	
Loom Type Supported	4, 6, 8, 10 & 12 Shuttle	
Operating Temperature	50°C Maximum	

RELAY PCB	DP150-L2	BP150-L2 (24V DC)
PCB	12V DC Model	NOT REQUIRED
Input Voltage (SMPS)	24V AC / DC	-----
Input Voltage (X'mer)	24V AC, 50Hz	-----
Input Current (SMPS)	65mA	-----
Input Current (X'mer )	235mA	-----



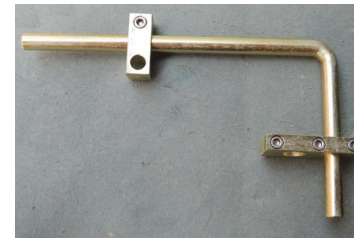
**RELAY PCB SINGLE  
SMPS TYPE**



**BOBBIN SENSOR  
DP150-L2**



**RELAY PCB SINGLE  
TRANSFORMER TYPE**



**L' CLAMP SET(3 PIECE)**



**CLAMP FOR  
BOBBIN SENSOR**



**BOBBIN SENSOR BP150-L2  
(PNP / NPN)**

**FOR MORE INFORMATION PLEASE CONTACT**



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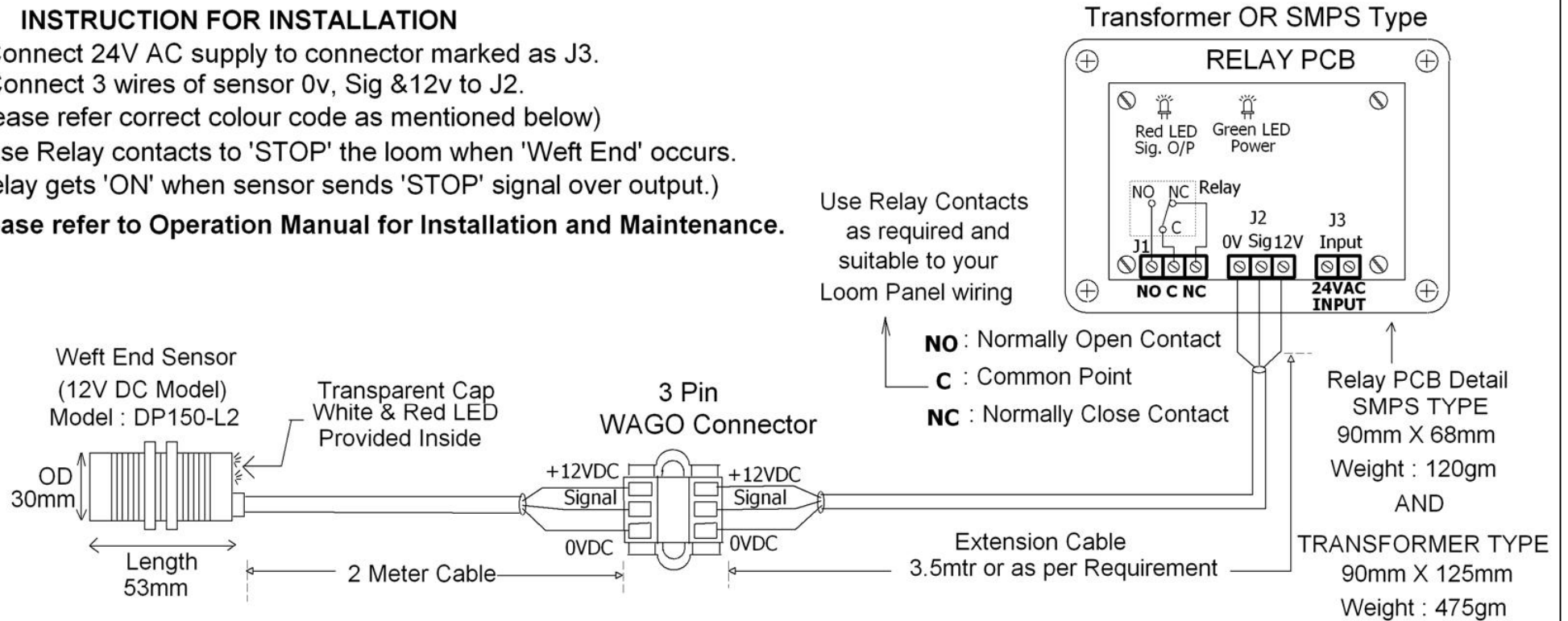
# CONNECTION DIAGRAM FOR WEFT END DETECTION (BOBBIN) SENSOR: (12V DC SENSOR WITH RELAY PCB)

## Option 1 : Universal Type : 12V DC Sensor with Relay PCB "Any combination is possible with Relay PCB"

### INSTRUCTION FOR INSTALLATION

1. Connect 24V AC supply to connector marked as J3.
2. Connect 3 wires of sensor 0v, Sig & 12v to J2.
- (Please refer correct colour code as mentioned below)
3. Use Relay contacts to 'STOP' the loom when 'Weft End' occurs.  
(relay gets 'ON' when sensor sends 'STOP' signal over output.)

**Please refer to Operation Manual for Installation and Maintenance.**



**NO** : Normally Open Contact  
**C** : Common Point  
**NC** : Normally Close Contact

### Sensor wire colour code

Connection	- 0 VDC	Signal	+ 12V DC
Wire	Blue	Black	Brown
Colour code	<b>BU</b>	<b>BK</b>	<b>BN</b>

### NOTE -

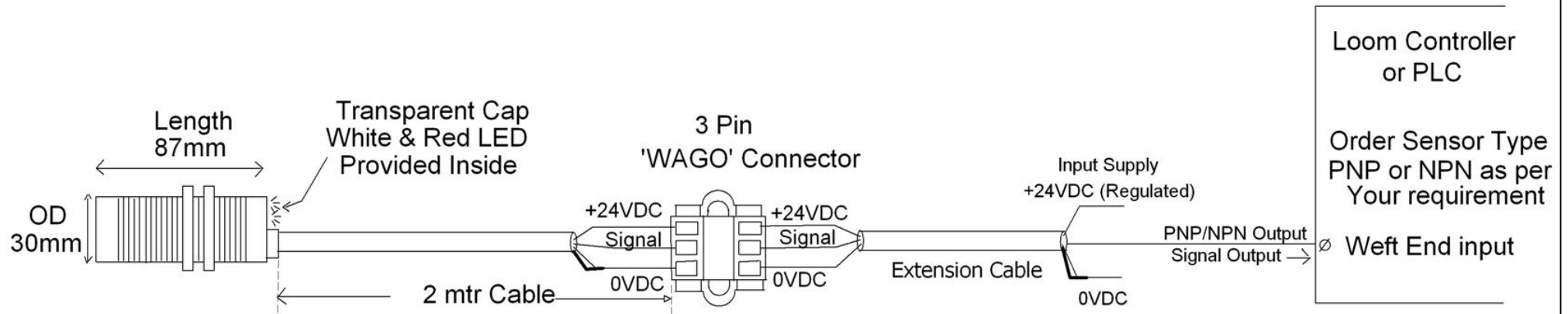
- 1) Input supply to SMPS type Relay PCB can be 24V DC also.
- 2) For mechanical loom, connect the Relay contact in series with 'STOP' push button wiring.
- 3) For electronic loom with loom controller or PLC, the Relay can be wired up to generate PNP or NPN signals of 24V DC or as required.

WE 4

Revision Date : 05/04/2017

CONNECTION DIAGRAM FOR WEFT END DETECTION (BOBBIN) SENSOR: (24V DC)

Option 2 : 24V DC Sensor for direct connectivity : PNP or NPN Output (Relay PCB not required.)



Weft End Sensor (24V DC Model)

Model : BP150-L2 (NPN)

OR

Model : BP150-L2 (PNP)

OD: 30mm

Length: 87mm

**Sensor wire colour code**

Connection	- 0 VDC	Signal	+ 12V DC
Wire	Blue	Black	Brown
Colour code	<b>BU</b>	<b>BK</b>	<b>BN</b>

**Note : -**

- 1) NPN or PNP type to be mentioned while ordering.
- 2) BP150-L2 (NPN) : 24V DC Sensor with NPN Output (Current Sink),  
Maximum Current 20mA
- 3) BP150-L2 (PNP) : 24V DC Sensor with PNP Output (Current Source),  
Maximum Current 20mA

**Please refer to Operation Manual for Installation and maintenance**

WE 2

Revision Date : 05/04/2017