

**ELECTRICAL OPTIONS/ SPECIFICATIONS**

OUTPUT OPTION	OUTPUT	SUPPLY	
A	0.5 TO 4.5V RATIO METRIC	5V	STANDARD
B	±5V	±15V	
C	0.5 TO 9.5V	24V	
D	±10V	±15V	BUFFERED
G	0.5 TO 4.5V	24V	
E	SUPPLY CURRENT 12mA TYP. 20mA MAX.	24V	
F	4 TO 20mA 2-WIRE	24V	
H	4 TO 20mA 3-WIRE SINK	24V	
	4 TO 20mA 3-WIRE SOURCE	24V	

SINK VERSION OUTPUT COMPLIANCE 5-28V  
SOURCE VERSION DRIVE 300Ω MAX TO 0V

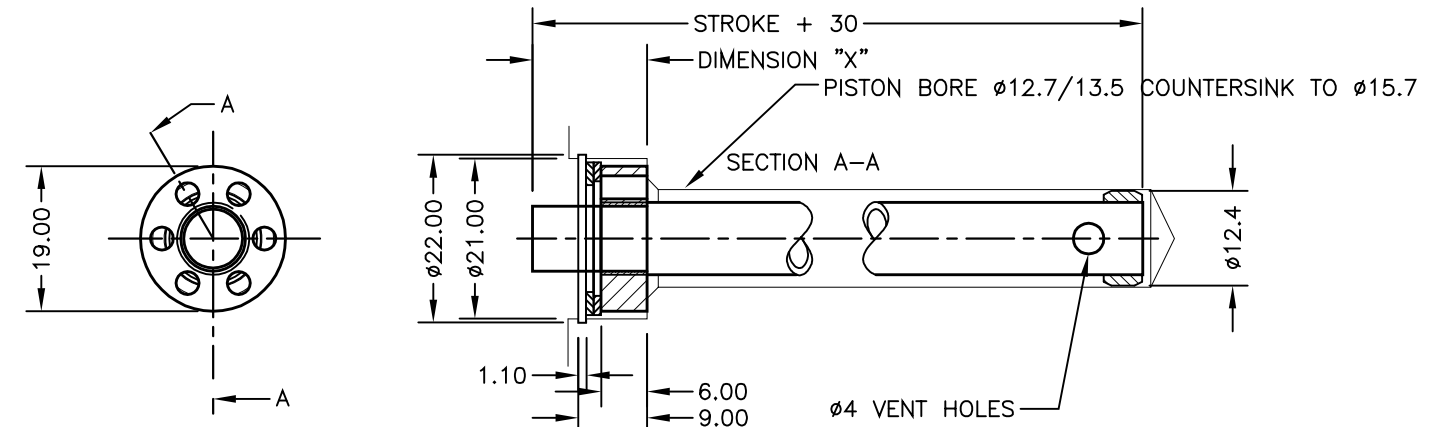
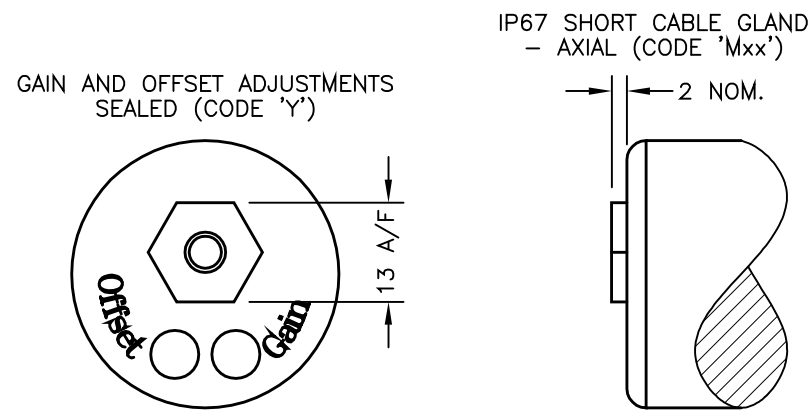
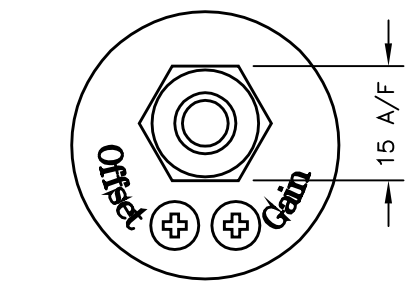
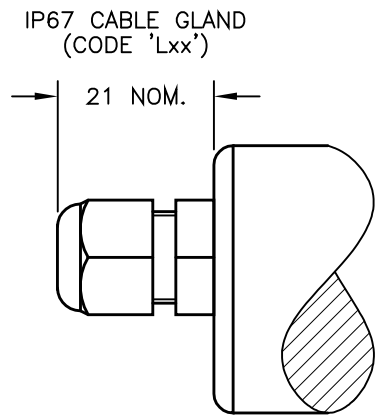
CABLE: 0.2mm<sup>2</sup>, 0/A SCREEN, PUR JACKET - SUPPLIED WITH 50cm OR REQUIRED LENGTH IN cm. e.g. 'L50'

3-CORE: JACKET Ø4mm  
4-CORE: JACKET Ø4.6mm

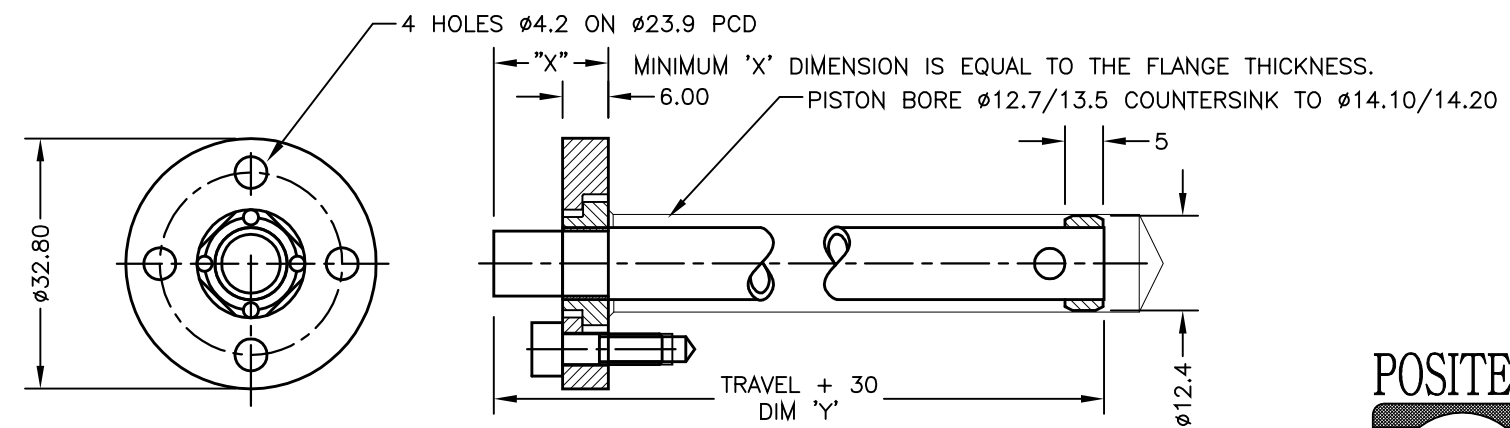
CABLE/CONNECTOR\* CONNECTIONS;  
3 CORE 4 CORE CONNECTOR

RED	RED	:1	+Ve
BLACK	GREEN	:3	0V
WHITE	YELLOW	:4	-Ve - OPTIONS: B OR D
SCREEN	BLUE	:2	OUTPUT
SCREEN	SCREEN	:4	BODY - OPTIONS: A, C, E-H

\*CONNECTORS; MAXIMUM CONDUCTOR CROSS SECTION 0.75mm<sup>2</sup>  
RANGE OF DISPLACEMENT FROM 0-400mm TO 0-1485mm IN INCREMENTS OF 1mm.  
BODY MATERIAL: STAINLESS STEEL.



WASHER, WAVY WASHER AND CIRCLIP SUPPLIED  
FLANGE OPTION 'V' CIRCLIP FITTING  
(ALLOWS ±1 CONCENTRICITY ERRORS)



FLANGE OPTION 'W' SCREW FITTING (EQUIVALENT TO MTS 201542 MAGNET)  
(ALLOWS ±0.8 CONCENTRICITY ERRORS)

A	FIRST ISSUE	RDS



DRAWINGS NOT TO BE CHANGED WITHOUT REFERENCE TO THE CHANGE PROCEDURE.  
CHANGES TO PARTS USED IN INTRINSICALLY SAFE PRODUCT MUST BE APPROVED BY THE AUTHORISED PERSON  
THIS IS AN UNCONTROLLED PRINT AND WILL NOT BE UPDATED.



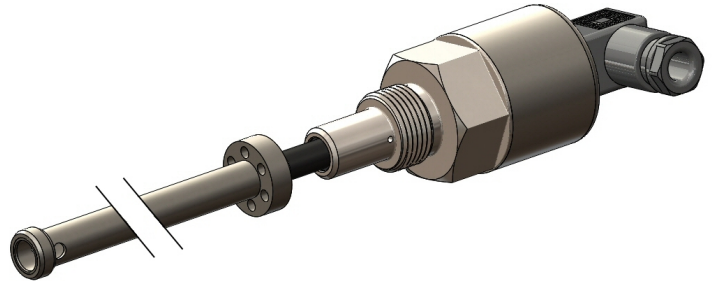
A	29/9/18	CHECKED BY	X ±0.4 X.X ±0.2 X.XX ±0.1 DIMS mm
DESCRIPTION			
P130 LIPS LONG STROKE IN-CYLINDER LINEAR POSITION SENSOR			
SCALE	10mm	DRAWING NUMBER	P130-11 REV A
			SHEET 1 OF 1



# P130 LONG STROKE IN-CYLINDER LINEAR POSITION SENSOR

High-resolution position feedback for hydraulic and pneumatic cylinders

- **Non-contacting inductive technology to eliminate wear**
- **Travel set to customer's requirement**
- **Compact and self-contained**
- **High durability and reliability**
- **High accuracy and stability**
- **Sealing to IP65/IP67 as required**



As a leading designer and manufacturer of linear, rotary, tilt and intrinsically safe position sensors, Positek® has the expertise to supply a sensor to suit a wide variety of applications.

Our P130 is an affordable, durable, high-accuracy position sensor designed for demanding hydraulic or pneumatic cylinder position feedback applications where service life, environmental resistance and cost are important. It is particularly suitable for OEMs seeking good sensor performance for arduous applications such as industrial machinery.

Overall performance, repeatability and stability are outstanding over a wide temperature range. The unit is highly compact and space-efficient, being responsive along almost its entire length. Like all Positek® sensors it provides a linear output proportional to travel. Each unit is supplied with the output calibrated to the travel required by the customer, any stroke from 0-400mm to 0-1485mm and with full EMC protection built in.

The sensor is very rugged, being made of stainless steel with an inert fluoropolymer-sheathed probe with the option of either an aluminium or stainless steel target tube. The sensor is easy to install in cylinders and has a wide range of mechanical and electrical options. Environmental sealing is to IP65 or IP67 depending on selected cable or connector options.

## SPECIFICATION

<b>Dimensions</b>	
Body diameter	35 mm
Body Length (to seal face)	43 mm standard, 48 mm buffered
Probe Length (from seal face)	calibrated travel + 58 mm
Target Tube Length	calibrated travel + 30 mm
<i>For full mechanical details see drawing P130-11</i>	
<b>Independent Linearity</b>	$\leq \pm 0.25\%$ FSO @ 20°C - up to 1000 mm $\leq \pm 0.5\%$ FSO @ 20°C - over 1000 mm
<b>Temperature Coefficients</b>	$< \pm 0.01\%/^{\circ}\text{C}$ Gain & $< \pm 0.01\%/\text{FS}/^{\circ}\text{C}$ Offset
<b>Frequency Response</b>	$> 10\text{ kHz}$ (-3dB) $> 300\text{ Hz}$ (-3dB) 2 wire 4 to 20 mA
<b>Resolution</b>	Infinite
<b>Noise</b>	$< 0.02\%$ FSO
<b>Environmental Temperature Limits</b>	
Operating	-40°C to +125°C standard -20°C to +85°C buffered
Storage	-40°C to +125°C
<b>Sealing</b>	IP65/IP67 depending on connector / cable option
<b>Hydraulic Pressure</b>	350Bar
<b>EMC Performance</b>	EN 61000-6-2, EN 61000-6-3
<b>Vibration</b> (Electronics)	IEC 68-2-6: 10 g
<b>Shock</b> (Electronics)	IEC 68-2-29: 40 g
<b>MTBF</b>	350,000 hrs 40°C Gf
<b>Drawing List</b>	
P130-11	Sensor Outline & Typical Target Installation details
P100-15	Mounting Thread details

*Drawings, in AutoCAD® dwg or dxf format, available on request.*

**Do you need a position sensor made to order to suit a particular installation requirement or specification? We'll be happy to modify any of our designs to suit your needs - please contact us with your requirements.**

*For further information please contact:*

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Positek, Andoversford Industrial Estate, Cheltenham GL54 4LB. U.K.

P130-17b

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# P130 LONG STROKE IN-CYLINDER LINEAR POSITION SENSOR

High-resolution position feedback for hydraulic and pneumatic cylinders

## How Positek's technology eliminates wear for longer life

Positek's Inductive technology is a major advance in displacement sensor design. Our displacement transducers have the simplicity of a potentiometer with the life of an LVDT/RVDT.

Our technology combines the best in fundamental inductive principles with advanced micro-electronic integrated circuit technology. A Positek sensor, based on simple inductive coils using Positek's ASIC control technology, directly measures absolute position giving a DC analogue output signal. Because there is no contact between moving electrical components, reliability is high and wear is eliminated for an exceptionally long life.

Our technology overcomes the drawbacks of LVDT technology – bulky coils, poor length-to-stroke ratio and the need for special magnetic materials. It requires no separate signal conditioning.

We also offer a range of ATEX-qualified intrinsically-safe sensors.

## TABLE OF OPTIONS

**CALIBRATED TRAVEL:** Factory set to any length from 0-400mm to 0-1485mm (e.g. 508mm)

### ELECTRICAL INTERFACE OPTIONS

OUTPUT SIGNAL	SUPPLY INPUT	OUTPUT LOAD
Standard: 0.5-4.5V dc ratiometric	+5V dc nom. ± 0.5V.	5kΩ min.
Buffered: 0.5-4.5V dc	+24V dc nom. + 9-28V.	5kΩ min.
±5V dc	±15V dc nom. ± 9-28V.	5kΩ min.
0.5-9.5V dc	+24V dc nom. + 13-28V.	5kΩ min.
±10V dc	±15 V dc nom. ± 13.5-28V.	5kΩ min.
Supply Current	10mA typical, 20mA maximum.	
4-20mA (2 wire)	+24 V dc nom. + 18-28V.	300Ω @ 24V.
(3 wire sink)	+24 V dc nom. + 13-28V.	950Ω @ 24V.
(3 wire source)	+24 V dc nom. + 13-28V.	300Ω max.

Sensors supplied with access to output 'zero' and 'span' calibration adjustments as standard. No access option available.

### CONNECTOR/CABLE OPTIONS

Connector - Hirschmann GD series IP65  
 Cable with M12 gland or short gland IP67  
 Cable length >50 cm – please specify length in cm

### MOUNTING THREAD OPTIONS

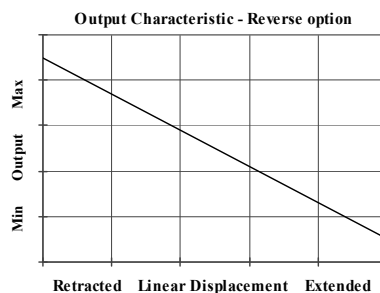
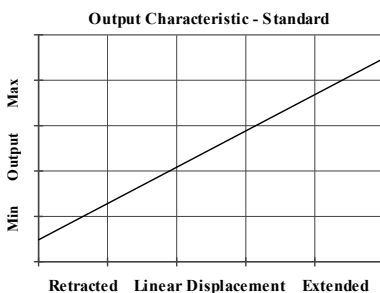
M18, M20, ¾ UNF 30 mm hex A/F, Ø 30 mm seal face.  
 Supplied with O-ring seal.

### TARGET TUBE

Stainless Steel (316) OD: 9.45 mm install in 12.7 min bore.

### FLANGE OPTIONS

'Circlip Fit' style  
 'Screw Fit' style



For further information please contact:

[www.positek.com](http://www.positek.com) [sales@positek.com](mailto:sales@positek.com)

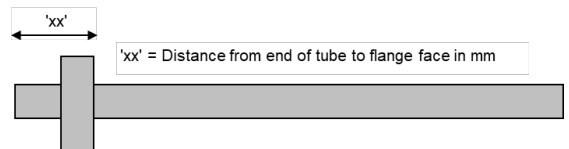
Tel: +44(0)1242 820027 fax: +44(0)1242 820615

Positek, Andoversford Industrial Estate, Cheltenham GL54 4LB. U.K.

# P130 In-Cylinder Linear Position Sensor

a	b	c	d	e	f	g	
P130	Displacement	Output	Adjustments	Connections	Option	Option	Z-code

a Displacement (mm)		Value
Displacement in mm	e.g. 0 - 254 mm	<b>254</b>
b Output		
Supply V dc V <sub>s</sub> (tolerance)	Output	Code
+5V (4.5 - 5.5V)	0.5 - 4.5V (ratiometric with supply)	<b>A</b>
±15V nom. (±9 - 28V)	±5V	<b>B</b>
+24V nom. (13 - 28V)	0.5 - 9.5V	<b>C</b>
±15V nom. (±13.5 - 28V)	±10V	<b>D</b>
+24V nom. (18 - 28V)	4 - 20mA 2 wire	<b>E</b>
+24V nom. (13 - 28V)	4 - 20mA 3 wire Sink	<b>F</b>
+24V nom. (9 - 28V)	0.5 - 4.5V	<b>G</b>
+24V nom. (13 - 28V)	4 - 20mA 3 wire Source	<b>H</b>
c Calibration Adjustments		Code
Accessible - default		blank
Sealed		<b>Y</b>
d Connections Cable or Connector		Code
Connector	IP65 DIN 43650 'C'	<b>J</b>
	pre wired	<b>Jxx</b>
Cable Gland	IP67 nylon	<b>Lxx</b>
Cable Gland <sup>†</sup>	IP67 Short	<b>Mxx</b>
Specify required cable length 'xx' in cm. e.g. L2000 specifies cable gland with 20 m of cable, 50 cm supplied as standard. <sup>†</sup> Nb: restricted cable pull strength.		
e Mounting Thread		Code
M20 x 1.5	Hex. 30 mm A/F, Ø 30 mm seal face.	<b>N</b>
3/4 16 UNF	Supplied with O-ring seal.	<b>P</b>
M18 x 1.5		<b>T</b>
See P100-15 Drawing for Mating Thread Details.		
f Target Tube Mounting Flange		Code
Ø19x6 Circlip retained	Please specify flange position in mm.	<b>Vxx</b>
Equivalent to MTS 201542 Magnet	eg. W17.5 specifies a MTS style flange fitted 17.5 mm from the	<b>Wxx</b>
See XXXX-11 Drawing for Target Details. See P130-12 Drawing for Typical Target Installation details.		
g Z-code		Code
Connector IP67 M12 IEC 60176-2-101 must have options 'Y' & 'J'		<b>Z600</b>
Connector IP67 M12 IEC 60176-2-101 must have option 'J'		<b>Z601</b>

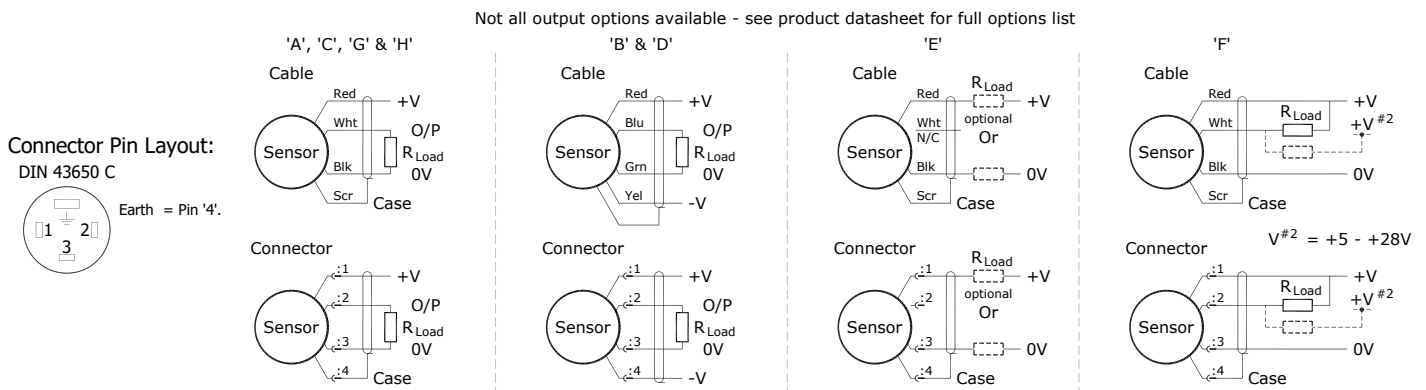




# Installation Information

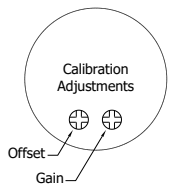
## P130 LONG STROKE IN-CYLINDER LINEAR POSITION SENSOR

Output Option	Output Description:	Supply Voltage: $V_s$ (tolerance)	Load resistance: (include leads for 4 to 20mA O/Ps)
<b>A</b>	0.5 - 4.5V (ratiometric with supply)	+5V (4.5 - 5.5V)	$\geq 5k\Omega$
<b>B</b>	$\pm 5V$	$\pm 15V$ nom. ( $\pm 9 - 28V$ )	$\geq 5k\Omega$
<b>C</b>	0.5 - 9.5V	+24V nom. (13 - 28V)	$\geq 5k\Omega$
<b>D</b>	$\pm 10V$	$\pm 15V$ nom. ( $\pm 13.5 - 28V$ )	$\geq 5k\Omega$
<b>E</b>	4 - 20mA 2 wire Current Loop	+24V nom. (18 - 28V)	$\approx 0 - 300\Omega$ max. @24V $\sim 1.2$ to 6V across 300 $\Omega$ $\{R_L \text{ max.} = (V_s - 18) / 20^{-3}\}$
<b>F</b>	4 - 20mA 3 wire Sink	+24V nom. (13 - 28V)	$\approx 0 - 950\Omega$ max. @24V $\sim 3.8$ to 19V across 950 $\Omega$ $\{R_L \text{ max.} = (V_s - 5) / 20^{-3}\}$
<b>G</b>	0.5 - 4.5V	+24V nom. (9 - 28V)	$\geq 5k\Omega$
<b>H</b>	4 - 20mA 3 wire Source	+24V nom. (13 - 28V)	$\approx 0 - 300\Omega$ max. $\sim 1.2$ to 6V across 300 $\Omega$



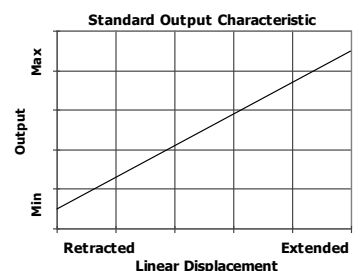
**Gain and Offset Adjustment:** (Where accessible - Typically  $\pm 10\%$  Min available)

To adjust the gain or offset use a small potentiometer adjuster or screwdriver 2mm across. Do not apply too much force on the potentiometers.



**Mechanical Mounting:** Via mounting thread, maximum tightening torque: 100Nm. See drawing P100-15, Installation Details Mounting Threads & Seals. An O ring seal is provided, size BS908 for M20 & 3/4 UNF thread or 14.3 x 2.4 for M18 thread. Install the target tube using the flange provided to fix into the piston rod. The target tube is intended to have some lateral freedom of movement to allow for misalignments in the assembly. The end of the target tube can be proud or flush with the piston end face as required. It is assumed that the sensor and target mounting points share a common earth.

**Output Characteristic:** Target position at start of normal travel is 36.0 mm from seal face. The output increases as the target is moved away from the sensor body, the calibrated stroke is between 400 mm and 1485 mm.



**Incorrect Connection Protection levels:-**

- A **Not protected** – the sensor is **not** protected against either reverse polarity or over-voltage. The risk of damage should be minimal where the supply current is limited to less than 50mA.
- B & D Supply leads diode protected. Output must not be taken outside  $\pm 12V$ .
- C & G Supply leads diode protected. Output must not be taken outside 0 to 12V.
- E, F & H Protected against any misconnection within the rated voltage.