

XD – P ***Current*** ***Transducers***



Operating Instructions December 2007

© Northern Design (Electronics) Ltd Bradford BD3 0QW UK

1 Current Input

All **XD-P** transducers monitor true rms AC amps in a conductor passing through a 10mm/19mm hole in the centre of the device in either direction. Each provides an isolated pulse output at a rate proportional to the measured current.

Two basic types are available, each with a user selectable range of full-scale input currents. Type 1 is used for lower currents and has a 10mm diameter hole for the current conductor. Type 2 is for higher currents and has a 19mm hole.

2 Pulse Output

Output pulses take the form of a momentary contact closure of a solid-state relay. The normally open relay contacts are short circuit for 100ms after each 1Wh (or 10Wh see tables above) of energy is accumulated.

The output pulses are scaled as Wh by assuming a fixed input voltage of 240V and a fixed power factor of 1.0 as:

$$\text{1-Phase kW} = 240\text{V} \times 1.0 \times \text{RMS Amps}$$

$$\text{3-Phase kW} = 3 \times 240\text{V} \times 1.0 \times \text{RMS Amps}$$

Energy (Wh) is determined by multiplying the instantaneous power by time (in hours).

DIP switches located on the underside of the unit are used to scale the input current and pulse output as shown in the tables below.

3 DIP Switches

DIP switches 1 and 2 set the nominal input current range for the **XD-P**. Care should be taken to ensure these are set correctly for the maximum current to be measured.

DIP switches 3,4 and 5 merely set the output scaling and calibration for the device

3.1 XD-P Type 1 (10mm Hole)

RMS Amps Full Scale	Assumed Volts	Power Full Scale	Pulse Rate Full Scale	DIP Switches
7.5A	240V, 1-Phase	1.8kW	1 pulse / wh 0.5hz	■■■■■■ OFF 1 2 3 4 5 6
15A	240V, 1-Phase	3.6kW	1 pulse / wh 1.0hz	■ ■ ■ ■ ■■ OFF 1 2 3 4 5 6
22.5A	240V, 1-Phase	5.4kW	1 pulse / wh 1.5hz	■ ■ ■ ■■■ OFF 1 2 3 4 5 6
30A	240V, 1-Phase	7.2kW	1 pulse / wh 2.0hz	■■■■ ■■ OFF 1 2 3 4 5 6
7.5A	240V, 3-Phase	5.4kW	1 pulse / wh 1.5hz	■ ■■■■ ■ OFF 1 2 3 4 5 6
15A	240V, 3-Phase	10.8kW	1 pulse / wh 3.0hz	■ ■■ ■ ■ ■ OFF 1 2 3 4 5 6
22.5A	240V, 3-Phase	16.2kW	1 pulse / 10wh 0.45hz	■ ■ ■ ■ ■ ■ OFF 1 2 3 4 5 6
30A	240V, 3-Phase	21.6kW	1 pulse / 10wh 0.6hz	■■■■■■ ■ OFF 1 2 3 4 5 6

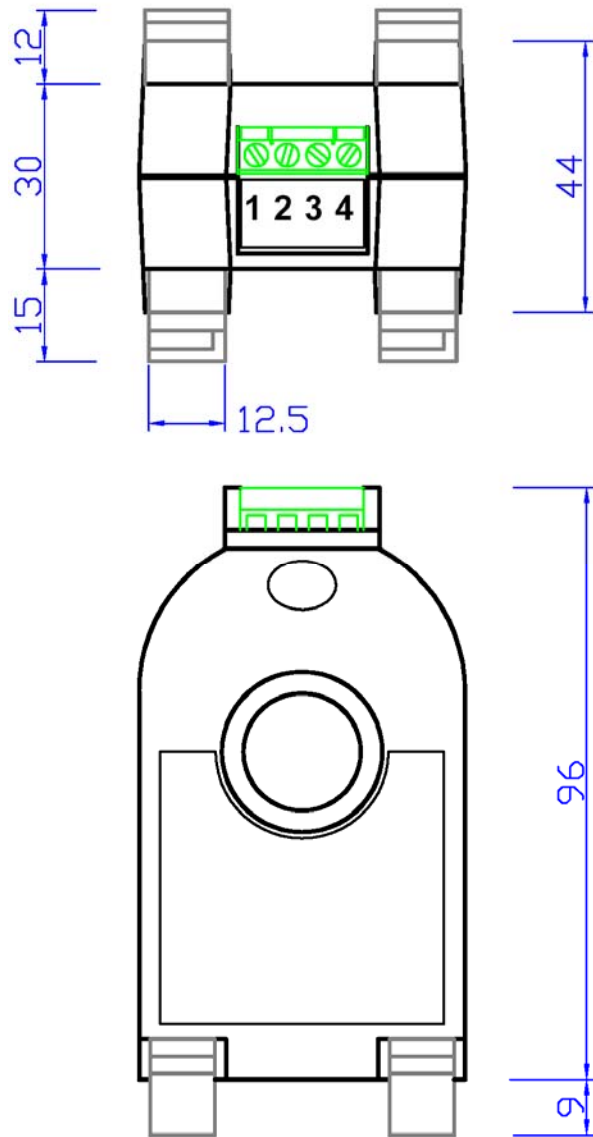
1. XD-P Type 1 DIP Switch Settings

3.2 XD-P Type 2 (19mm Hole)

RMS Amps Full Scale	Assumed Volts	Power Full Scale	Pulse Rate Full Scale	DIP Switches
30A	240V, 1-Phase	7.2kW	1 pulse / wh 2.0hz	■■■■■■ OFF 1 2 3 4 5 6
60A	240V, 1-Phase	14.4kW	1 pulse / wh 4.0hz	■ ■ ■ ■ ■■ OFF 1 2 3 4 5 6
90A	240V, 1-Phase	21.6kW	1 pulse / 10wh 0.6hz	■ ■ ■ ■■■ OFF 1 2 3 4 5 6
120A	240V, 1-Phase	28.8kW	1 pulse / 10wh 0.8hz	■■■■ ■ ■ OFF 1 2 3 4 5 6
30A	240V, 3-Phase	21.6kW	1 pulse / 10wh 0.6hz	■ ■■■■ ■ OFF 1 2 3 4 5 6
60A	240V, 3-Phase	43.2kW	1 pulse / 10wh 1.2hz	■ ■ ■ ■ ■ ■ OFF 1 2 3 4 5 6
90A	240V, 3-Phase	64.8kW	1 pulse / 10wh 1.8hz	■ ■ ■ ■ ■ ■ OFF 1 2 3 4 5 6
120A	240V, 3-Phase	86.4kW	1 pulse / 10wh 2.4hz	■■■■■■ ■ OFF 1 2 3 4 5 6

2. XD-P Type 2 DIP Switch Settings

4 Dimensions

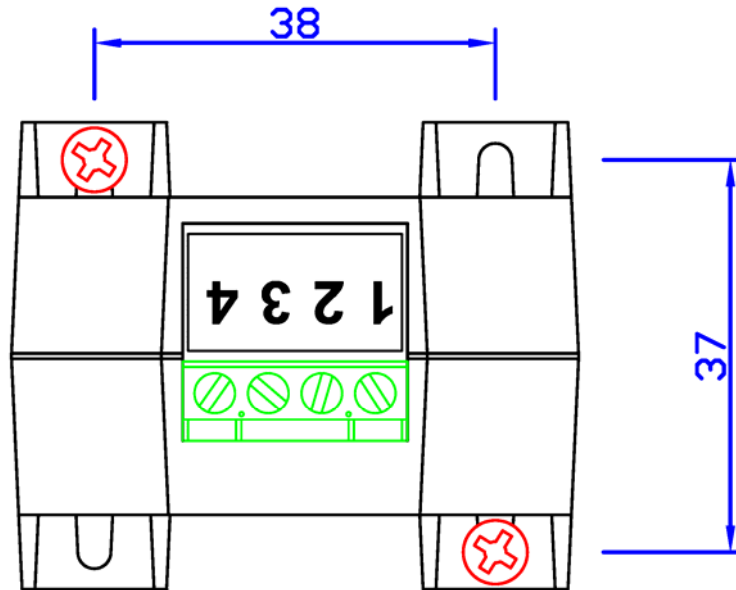


3. Dimensioned Drawing (Including Rail MountClips)

5 Mounting The Unit

5.1 Panel Mounting

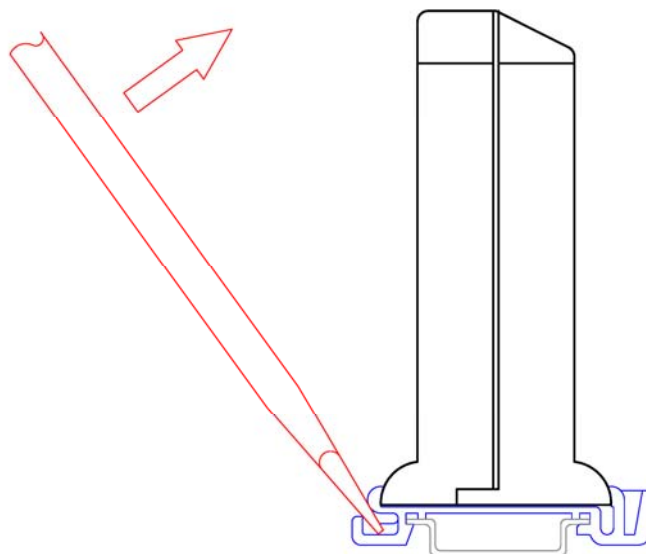
Four mounting holes are provided which enable the XD transducer to be screwed to a flat panel or mounting plate.



4. Panel Mounting Template

5.2 DIN Rail Mounting

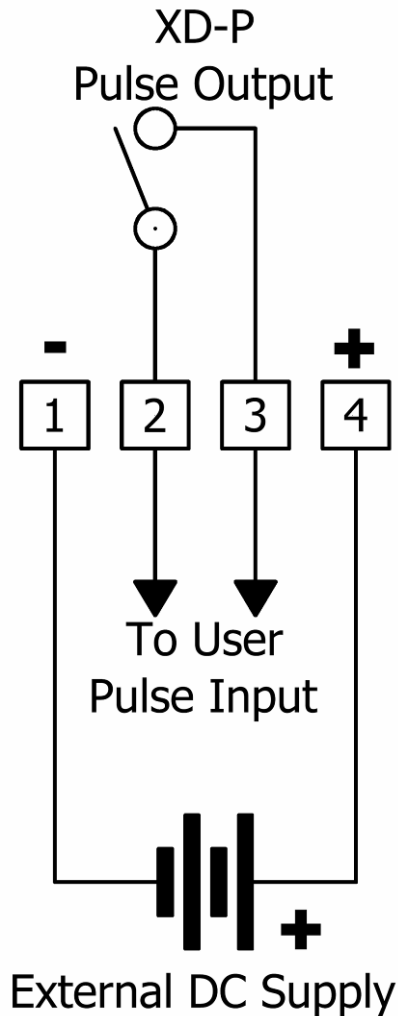
A mounting kit for symmetrical DIN rail is provided which is fitted to the bottom of the transducer as shown below. To remove the transducer from the DIN rail use a flat screwdriver to release the clip as shown.



5. DIN Rail Mounting Option

6 Connections

The volt free pulse output contacts may be connected to a suitable pulse input of an external counter, PLC, building management system etc. An external DC supply is required to energise the XD-P electronics. This is connected as shown.



6. DIN Rail Mounting Option

7 Specification

Nominal Input Ranges	
XD-P Type 1	True rms: 0-7.5A, 0-15A, 0-22.5A, 0-30A.
XD-P Type 2	True rms: 0-30A, 0-60A, 0-90A, 0-120A.

Pulse Output	
Pulse Rate (Assumed 240V Input)	Nom Input \leq 14.4kW: 1 Pulse / wh Nom Input $>$ 14.4kW: 1 Pulse / 10wh
Pulse Length	100ms (\pm 10ms)
Contacts	100V ac/dc, 10mA, 5W maximum
Isolation	Input to Output 4kV, 50Hz, 1 second. Output to External Supply 50V dc.

Measurement Range	
XD-P	0-110% of nominal input range selected.
Input Overload	2 x Nominal input range selected, continuous. 15 x Nominal input range selected for 10 seconds.
Crest Factor (Ipk / Irms)	Max 1.8 (at 100% nominal full scale)

Accuracy (All Types)	
Typical	\pm 0.5%. FS.
Maximum	\pm 1.0%. FS.

External Supply	
Voltage	Nominal 24Vdc (12V \leq Vdc \leq 36V)
Current Rating	10mA per XD-P Connected.

Miscellaneous	
Frequency Range	45 – 65 Hz standard.
Temperature	Operating 0 to 60 deg C. Storage -20 to +70 deg C.
Humidity	95 % RH (non-condensing).
Dimensions	Panel Mounted: L=53mm, W=44mm, H=96mm Rail Mounts Fitted: L=53mm, W=57.5mm, H=104m