

**Example.**

The example below shows the HPL220 attached to a force-transducer (load-cell). The limits, start-delay, reaction time and hysteresis are programmed as described in the previous pages. The relay contacts NC1, C1 are disconnected when the limit 1 is exceeded and NC2, C2 makes the same function for limit 2. The drawing does not show how the relays are connected in the actual protection scheme (application specific). The alarm must be reset,

either using the reset key located on the front panel or from the external reset input, S1. If the input S1 and Grd are shorted (Auto-Reset), then the alarm activates the hysteresis function implementing a simple two- or four-point regulation. The input S2 is used to disable the max. & min. alarms and its primary function is to avoid the generation of a min. limit alarm when the load is removed intentionally (normal shut down).

# Unipower

HPL220 Version 1.2

Technical Information

English Edition

**Technical Specification**

**Mechanical**

**Housing**

Makrolon 8020 (30% GV), UL94V-1 (house).  
Makrolon 2800, UL94V-2 (connector + front).

**Mounting**

Snap-on construction for 35mm DIN rail mounting.

**Protection Class**

IP40 (house).  
IP20 (connector).

**Operating Temperature Range**

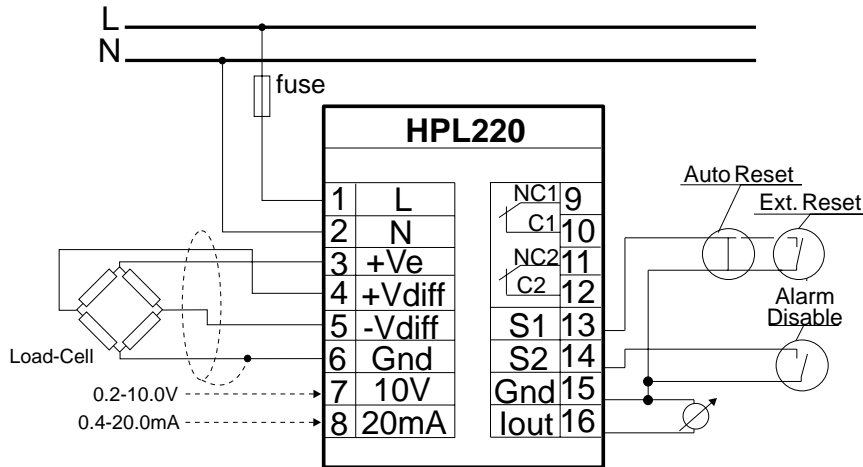
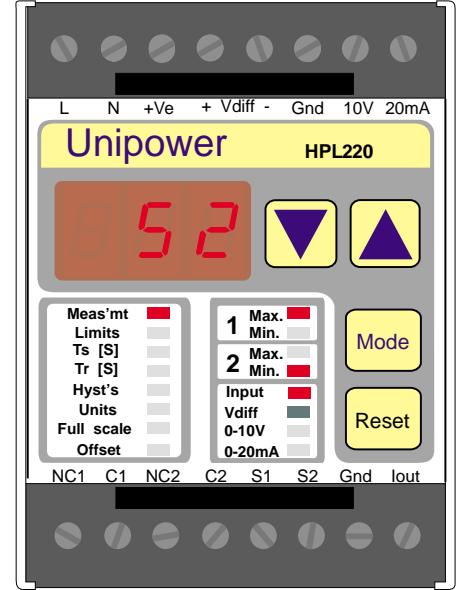
-15 - +50 °C.

**Weight**

Approximately 500g.

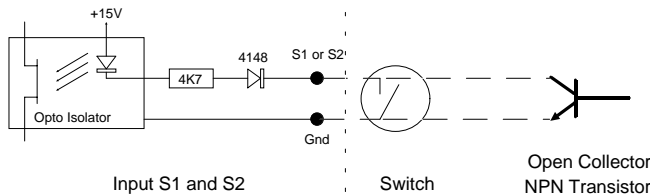
**Dimensions**

D 75 x B 56 x H 110 mm.



Only one input (3-4-5-6 or 6-7 or 6-8) must be connected

Example: HPL220 connected to a load-cell



If you need further information about the HPL-family of **Intelligent Power-Control Units** and its ability to solve your problems, please do not hesitate to contact your distributor.

**WEN**technology

Raleigh, NC, USA

(919) 954-1004 [www.wentec.com](http://www.wentec.com)

**Electrical**

**Supply**

See technical info on the unit.  
Also available:  
1 x 120 VAC -> 1 x 240 VAC

**Measurement Ranges**

Input Vdiff = 10-500 mV 100 kohm.  
Input 10V = 0.2-10 V 850 kohm.  
Input 20 mA = 0.4-20 mA 25 ohm.

**Consumption**

4 VA.

**Transducer Supply**

10V stabilized max. load 330 ohm.  
15V stabilized max. load 450 ohm.

**Relay Output**

250 VAC/5 Amp.

**Analogue Output**

4-20 mA, 0 - 400 ohm.

**The output is not electrically isolated from the measurement system.**

**THE CONCEPT**

The **Unipower HPL220** is a member of a family of **"Intelligent Control Units"** which is based upon the latest advance in Microcontroller Technology. The HPL220 operates as both a measurement transducer and a signal conditioner for many different types of transducers. The device includes 2 trip points and associated relay outputs, timers and hysteresis functions which makes it an extremely flexible control unit. The HPL220 accepts 3 different type of transducer signals: 0-500 mV differential, 0-10V and 0(4)-20mA. Each signal range is continous scalable with respect to span and offset. The lowest measurement range is 10mV/0,4 mA F.S. The unit has a stabilized 10(15)V supply for the transducer. The HPL220 is able to show the transducer signal as reel units (kg, bar, Nm, etc.). The offset, limits, hysteresis is programmed in real units as well.

## Programming & Display.

Mode	Function	Variable	▼	▲	Display	Default
Meas'mt	Display measurement		Min. peak	Max. peak	Meas'mt	
Limits	Limit 1 prog./display	Off, 1-Units	Decrease	Increase	Limit 1	80
Limits	Limit 2 prog./display	Off, 1-Units	Decrease	Increase	Limit 2	Off
Ts [S]	Start timer	0.0-25.0 Sec.	Decrease	Increase	Ts [Sek]	2.0 Sec.
Tr [S]	Alarm reaction timer 1	0.0-25.0 Sec.	Decrease	Increase	Tr [Sek]	0.1 Sec.
Tr [S]	Alarm reaction timer 2	0.0-25.0 Sec.	Decrease	Increase	Tr [Sek]	0.1 Sec.
Hyst's	Hysteresis 1	Off, 1-Units	Decrease	Increase	Hyst's [%]	Off
Hyst's	Hysteresis 2	Off, 1-Units	Decrease	Increase	Hyst's [%]	Off
Units	Max measurement units	00-999,0.00-9.99,0.0-99.9	Decrease	Increase	'Units'	100
Full scale	Max. input (mV, V, mA)	10-500,0.2-10.0,0.4-20.0	Decrease	Increase	'Full scale'	500
Offset	Offset adjust +-	+ - Units	Decrease	Increase	Offset (Units)	0 (Units)
Input	Input select	Vdiff, 10V, 20mA	Vdiff-10V-20mA	20mA-10V-Vdiff	"Inp"	Vdiff

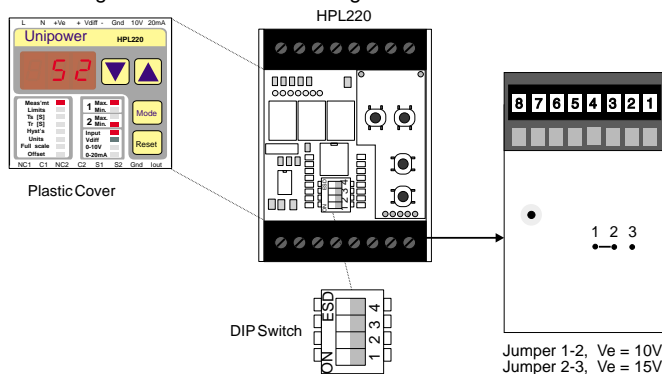
LED Usage	
Alarm 1 active	Max/Min 1 LED flashes
Alarm 2 active	Max/Min 2 LED flashes
Start delay active	Ts LED On
Alarm delay active	Tr LED On

DIP Switch Usage		
SW 1	Programming protection off	Off
SW 1	Programming protection on	On
SW 2	Bipolar mode	Off
SW 2	Unipolar (absolute) mode	On
SW 3	Limit 1 = Max. Limit	Off
SW 3	Limit 1 = Min. Limit	On
SW 4	Limit 2 = Max. Limit	Off
SW 4	Limit 2 = Min. Limit	On

The HPL220 is programmed by the use of only three keys located on the front panel. The mode key is used to switch the display from showing current measurement to display one of the 11 programmable variables. All the variables and their programming ranges are listed in the function table above. The red 'mode' LED's, the 'Max./Min. LED's and the 'Input' LED is used to show which variable may be altered. When a variable has been selected by the mode key then the value may be altered by the two arrow-keys. Note that the keys are repeated if held down continuously. Variables are stored in EEPROM. When no key has been activated for about 5 seconds the display returns to the 'Meas'mt' position (Normal Operation). When the Dip. Sw. 1 is 'On' the unit is protected against programming; but it is still possible to display the current settings.

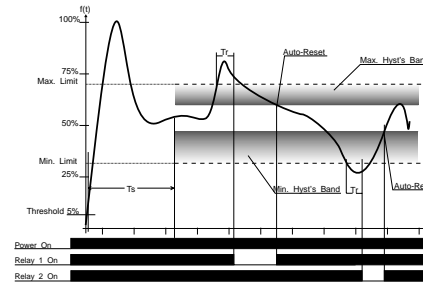
### Dip. Switch & Jumper Access.

1. Disconnect the Mains Power.
2. Remove the plastic cover. (Use a small screwdriver).
3. Change the switch settings and assemble the unit again.



## Function.

The HPL220 is often used together with a load-cell (transducer) to protect motor driven machinery against overload etc. Other members of the HPL-family realizes the same function just from the measurement of the power consumption of the motor. The HPL220 is used in special cases where the power-consumption of the motor varies little as a function of the change of load. This is for example true when the motor uses a gear with a very large exchange ratio. The drawing below shows a possible load curve of a machine taken immediately after starting.



### Signal conditioning & Programming.

#### a) Input selection.

The 'Mode' key is used to select 'Input' and the arrow keys are used to program the 'input' to match the output of the transducer. The transducer is interfaced to the HPL220 terminals, which corresponds to the input selected.

#### b) Full scale programming.

The 'Mode' key is used to select 'Full scale' and the arrow keys are used to change the measurement range continuously within the input-range (see table).

#### c) Units programming.

The 'Mode' key is used to select 'Units' and the arrow keys are used to select the display value, which must be shown when the transducer output reaches the full scale previously programmed.

#### d) Offset programming.

The 'Mode' key is used to select 'Offset' and the arrow keys are used to select the value which corresponds to the actual or expected offset. The offset might be chosen to be positive as well as negative. The offset is programmed in 'Units'.

#### e) Absolute measurement.

The HPL220 measures bipolar input signals, but is able to show two digit negative values only. If the Dip. Sw. 2 is set to pos. 'On' negative signals are in-

verted. When the absolute mode is selected the measurement range becomes +/- 100% full scale.

#### f) Limits programming.

The limit (1 or 2) is selected by the 'Mode' key and the arrow keys are used to change the limit. The limits are programmable in real units. If the limit is set to 0 it is switched 'Off'.

#### g) The start delay (Ts).

The start delay is used to disable alarms during machine start. If Ts is programmed to 0.0 it has no function. The start delay is activated when the measurement reaches 5% of the selected 'Units'.

#### h) The alarm delay (Tr).

The alarm delay is used to avoid alarms from very short signal peaks.

#### i) The hysteresis function.

When Auto-Reset has been chosen the hysteresis function becomes active when an alarm is generated. When a max limit is used the hysteresis band is placed below the limit and with a min. limit the band is placed above the limit.

**Ex. 1: A temperature transducer with an output of 4-20 mA in the range of 10-110 °C is interfaced to the HPL220.**

**Programming:** First the 'Input' is programmed to 0-20 mA. Second the 'Full scale' is programmed to 20 corresponding to the maximum input current ( $I_{max}$ ) and the 'Units' and 'offset' are set as follows:  
 $Units = (Unit_{max} - Unit_{min}) * Full\ scale / (I_{max} - I_{min})$   
 $Units = (110 - 10) * 20 / (20 - 4) = 125$

$Offset = Units - Unit_{max} = 125 - 110 = 15$

#### Ex. 2: The differential input.

The differential input is used to interface pressure transducers and load-cells, often strain-gauge bridge devices, to the HPL220. The power supply to the bridge (10V or 15V) is generated by the unit. The example on page 4 shows the HPL220 connected to a load-cell and used with the HPL220 to protect a machine against overload and damage.

**Programming:** 1. Select the Vdiff 'Input'. 2. Program 'Units' to the real value ex. 1000 kg. 3. The 'Full scale' is programmed equal to the load-cell F.S. (10-500 mV) or to the part of the dynamic range used in the actual application. 4. When the load-cell has been mounted the actual 'Meas'mt' is read. This value corresponds to the offset caused by the transducer and the static load. The same value is programmed as an offset and the 'Meas'mt' now shows zero until load is applied. 5. If the machine rotates both CW and CCW the dip switch no. 2 must be switched 'On'.