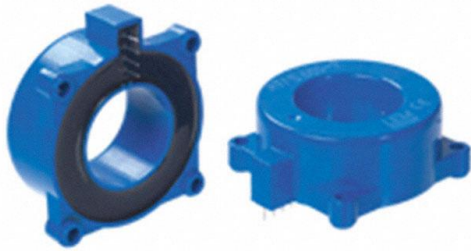


# HTFS 400-P Datasheet

[www.digi-electronics.com](http://www.digi-electronics.com)



<https://www.DiGi-Electronics.com>

|                              |   |
|------------------------------|---|
| DiGi Electronics Part Number | HTFS 400-P-DG   |
| Manufacturer                 | <a href="#">LEM USA Inc.</a>  |
| Manufacturer Product Number  | HTFS 400-P  |
| Description                  | SENSOR CURRENT HALL 400A AC/DC  |
| Detailed Description         | Current Sensor 400A 1 Channel Hall Effect, Open Loop Bidirectional Module |

This model HTFS 400-P is available at DiGi Electronics.

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We welcome your inquiries regarding pricing, lead time, or other product-related questions.

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RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

HTFS 400-P

Series:

HTFS

For Measuring:

AC/DC

Current - Sensing:

400A

Output:

Ratiometric, Voltage

Frequency:

DC ~ 240kHz

Accuracy:

±1%

Response Time:

3.5µs

Operating Temperature:

-40°C ~ 105°C

Mounting Type:

Through Hole

Supplier Device Package:

-

Manufacturer:

LEM USA Inc.

Product Status:

Active

Sensor Type:

Hall Effect, Open Loop

Number of Channels:

1

Sensitivity:

-

Linearity:

±0.5%

Voltage - Supply:

5V

Current - Supply (Max):

25mA

Polarization:

Bidirectional

Package / Case:

Module

## Environmental & Export classification

RoHS Status:

RoHS Compliant

REACH Status:

REACH Unaffected

HTSUS:

9030.33.3800

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

## Current Transducer HTFS 200 ... 800-P

For the electronic measurement of currents: DC, AC, pulsed..., with galvanic separation between the primary circuit and the secondary circuit.



All data are given with  $R_L = 10\text{ k}\Omega$

### Electrical data

| Primary nominal RMS current<br>$I_{PN}$ (A) | Primary current measuring range<br>$I_{PM}$ (A) | Type   |
|---|---|--|
| 200   | $\pm 300$                                       | <b>HTFS 200-P</b>  |
| 400   | $\pm 600$                                       | <b>HTFS 400-P</b>  |
| 600   | $\pm 900$                                       | <b>HTFS 600-P</b>  |
| 800   | $\pm 1200$                                      | <b>HTFS 800-P</b>  |
| $U_{out}$                                   | Output voltage (Analog) @ $I_p$<br>$I_p = 0$    | $U_{ref} \pm (1.25 \cdot I_p / I_{PN})$ V<br>$U_{ref} \pm 0.025$ V |
| $U_{ref}$                                   | Reference voltage                               | $1/2 U_C \pm 0.025$ V  |
|   | $U_{ref}$ Output impedance                      | typ. 200 $\Omega$  |
|   | $U_{ref}$ Load impedance                        | $\geq 200$ k $\Omega$  |
| $R_L$                                       | Load resistance                                 | $\geq 2$ k $\Omega$  |
| $R_{out}$                                   | Output internal resistance                      | $< 5$ $\Omega$   |
| $C_L$                                       | Load capacitance                                | $= 4.7$ nF   |
| $U_C$                                       | Supply voltage ( $\pm 5\%$ )                    | 5 V  |
| $I_C$                                       | Current consumption @ $U_C = 5\text{ V}$        | 19 (typ) mA<br>25 (max) mA   |

### Accuracy - Dynamic performance data

|                  |   |                |                  |
|------------------|---|----------------|------------------|
| $\epsilon_{tot}$ | Total error <sup>2)</sup> @ $I_{PN}$ , $T_A = 25^\circ\text{C}$   | $\leq \pm 1$   | %                |
| $\epsilon_L$     | Linearity error 0 ... $1.5 \times I_{PN}$   | $\leq \pm 0.5$ | %                |
| $TCU_{OE}$       | Temperature coefficient of $U_{OE}$ @ $I_p = 0$   | $\leq \pm 0.1$ | mV/K             |
| $TCU_{ref}$      | Temperature coefficient of $U_{ref}$  | $\leq \pm 190$ | ppm/K            |
| $TCS$            | Temperature coefficient of $U_{out}$  | $\leq \pm 420$ | ppm/K            |
| $U_{OM}$         | Magnetic offset voltage @ $I_p = 0$ and specified $R_M$ ,<br>after an overload of $3 \times I_{PNDC} < \pm 0.5$ |                | %                |
| $U_{no}$         | RMS noise voltage referred to primary (DC ... 20 MHz)   | $< 40$         | mVpp             |
| $t_{D10}$        | Delay time to 10 % of the final output value for $I_{PN}$ step  | $< 2$          | $\mu\text{s}$    |
| $t_{D90}$        | Delay time to 90 % of the final output value for $I_{PN}$ step  | $< 3.5$        | $\mu\text{s}$    |
| $di/dt$          | $di/dt$ accurately followed   | $> 100$        | A/ $\mu\text{s}$ |
| $BW$             | Frequency bandwidth ( $-3\text{ dB}$ ) <sup>3)</sup>  | DC ... 240     | kHz              |

- Notes:**
- 1) It is possible to overdrive  $U_{ref}$  with an external reference voltage between 0.5 - 2.65 V
  - 2) Excluding offset and magnetic offset voltage
  - 3) Small signal only to avoid excessive heatings of the magnetic core.

$$I_{PN} = 200 \dots 800\text{ A}$$



### Features

- Hall effect measuring principle
- Galvanic separation between primary and secondary circuit
- Low power consumption
- Single power supply +5 V
- Ratiometric offset
- Insulating plastic case recognized according to UL 94-V0
- Fixation by M3 nuts and screws
- $T_A = -40^\circ\text{C} \dots +105^\circ\text{C}$ .

### Advantages

- Small size and space saving
- Only one design for wide current ratings range
- High immunity to external interference
- $U_{ref}$  IN/OUT.

### Applications

- Forklift drives
- AC variable speed drives
- Static converters for DC motor drives
- Battery supplied applications
- Uninterruptible Power Supplies (UPS)
- Switched Mode Power Supplies (SMPS)
- Power supplies for welding applications.

### Application domain

- Industrial.



## Current Transducer HTFS 200 ... 800-P

### General data

|           |                               |                |    |
|-----------|-------------------------------|----------------|----|
| $T_A$     | Ambient operating temperature | -40 ... +105   | °C |
| $T_{Ast}$ | Ambient storage temperature   | -40 ... +105   | °C |
| $m$       | Mass                          | 60             | g  |
|           | Standard                      | EN 50178: 1997 |    |

### Insulation coordination

|          |   |       |    |
|----------|---|-------|----|
| $U_d$    | RMS voltage for AC insulation test, 50 Hz, 1 min    | 2.5   | kV |
| $U_i$    | Partial discharge RMS test voltage ( $q_m < 10$ pC) | > 1   | kV |
| $U_{Ni}$ | Impulse withstand voltage 1.2/50 $\mu$ s            | 4     | kV |
|          |   | Min   |    |
| $d_{Cp}$ | Creepage distance                                   | > 4   | mm |
| $d_{Cl}$ | Clearance distance                                  | > 4   | mm |
| $CTI$    | Comparative Tracking Index (group IIIa)             | > 220 |    |

### Applications examples

|                          | EN 50178                 | IEC 61010-1     |
|--------------------------|--------------------------|-----------------|
| $d_{Cp}, d_{Cl}, U_{Ni}$ | Rated insulation voltage | Nominal voltage |
| Basic insulation         | 300 V                    | 300 V           |
| Reinforced insulation    | 150 V                    | 150 V           |

According to EN 50178 and IEC 61010-1 standards and following conditions:

- Over voltage category OV 3
- Pollution degree PD2
- Non-uniform field

### Safety

This transducer must be used in limited-energy secondary circuits according to IEC 61010-1.



This transducer must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer's operating instructions.



Caution, risk of electrical shock

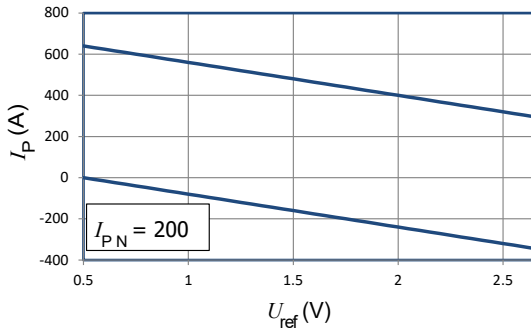
When operating the transducer, certain parts of the module can carry hazardous voltage (eg. primary busbar, power supply). Ignoring this warning can lead to injury and/or cause serious damage.

This transducer is a build-in device, whose conducting parts must be inaccessible after installation. A protective housing or additional shield could be used.

Main supply must be able to be disconnected.

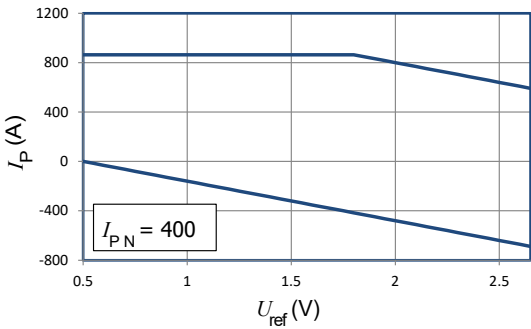


## HTFS measuring range with external $U_{ref}$



$$\text{Upper limit: } I_p = -160 \times U_{ref} + 720 \quad (U_{ref} = 0.5 \dots 2.65 \text{ V})$$

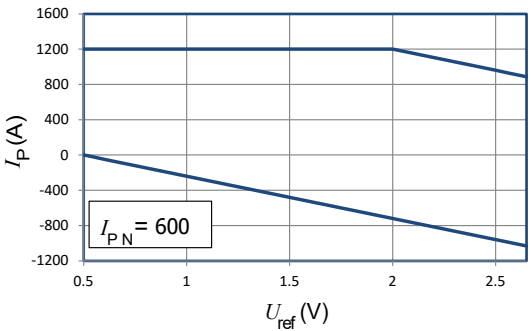
$$\text{Lower limit: } I_p = -160 \times U_{ref} + 80 \quad (U_{ref} = 0.5 \dots 2.65 \text{ V})$$



$$\text{Upper limit: } I_p = 864 \quad (U_{ref} = 0.5 \dots 1.8 \text{ V})$$

$$\text{Upper limit: } I_p = -320 \times U_{ref} + 1440 \quad (U_{ref} = 1.8 \dots 2.65 \text{ V})$$

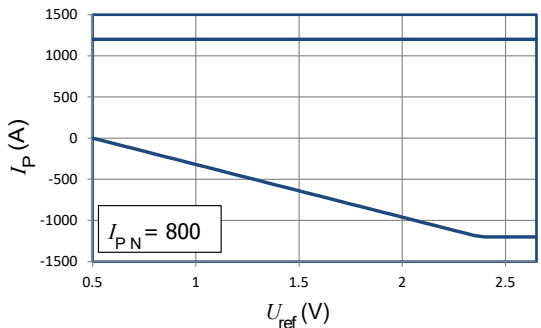
$$\text{Lower limit: } I_p = -320 \times U_{ref} + 160 \quad (U_{ref} = 0.5 \dots 2.65 \text{ V})$$



$$\text{Upper limit: } I_p = 1200 \quad (U_{ref} = 0.5 \dots 2.0 \text{ V})$$

$$\text{Upper limit: } I_p = -480 \times U_{ref} + 2160 \quad (U_{ref} = 2 \dots 2.65 \text{ V})$$

$$\text{Lower limit: } I_p = -480 \times U_{ref} + 240 \quad (U_{ref} = 0.5 \dots 2.65 \text{ V})$$



$$\text{Upper limit: } I_p = 1200 \quad (U_{ref} = 0.5 \dots 2.625 \text{ V})$$

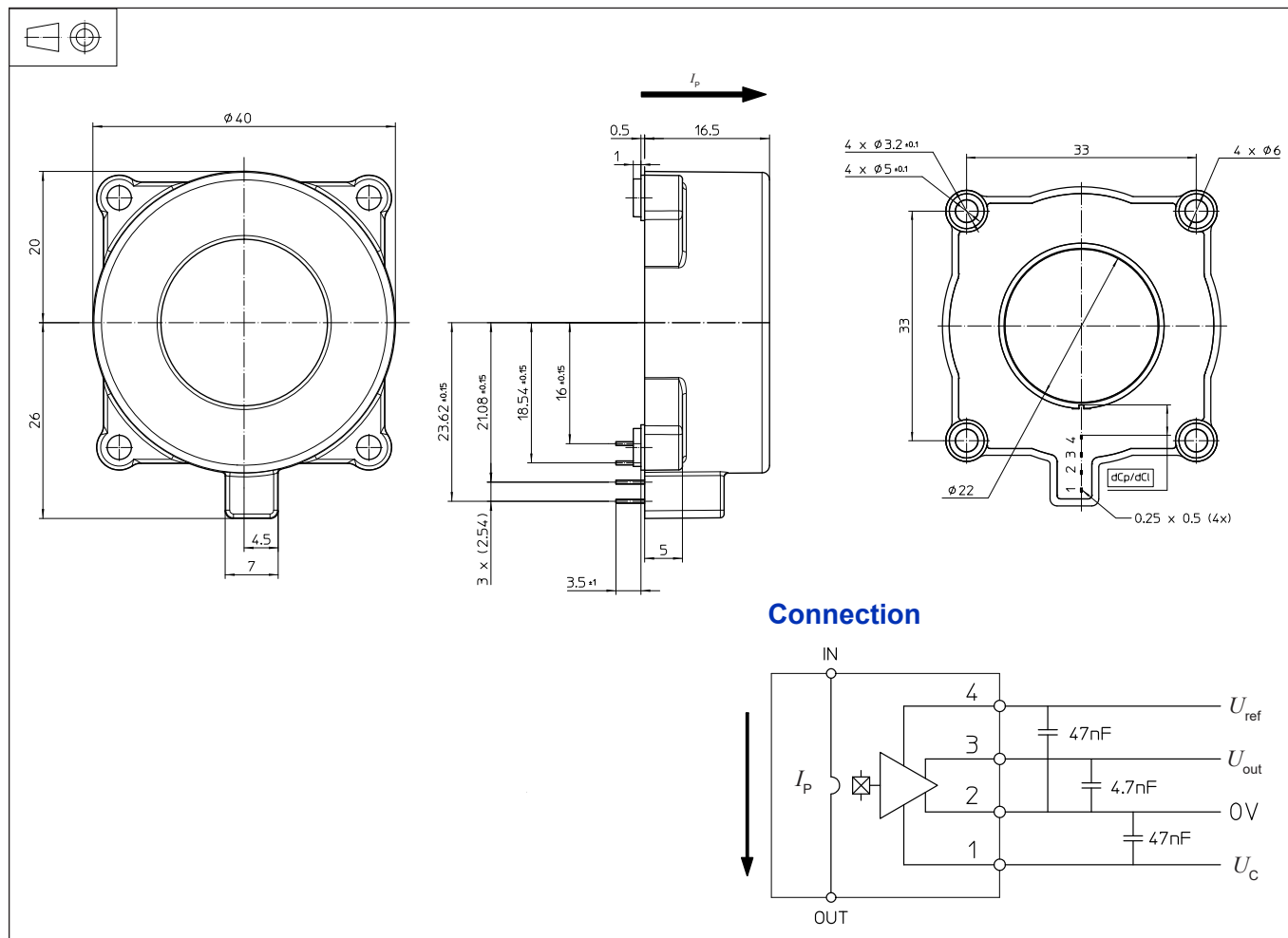
$$\text{Upper limit: } I_p = -640 \times U_{ref} + 2880 \quad (U_{ref} = 2.625 \dots 2.65 \text{ V})$$

$$\text{Lower limit: } I_p = -640 \times U_{ref} + 320 \quad (U_{ref} = 0.5 \dots 2.4 \text{ V})$$

$$\text{Lower limit: } I_p = -1200 \quad (U_{ref} = 2.4 \dots 2.65 \text{ V})$$



## Dimensions HTFS 200 ... 800-P (in mm)



### Mechanical characteristics

- General tolerance  $\pm 0.2$  mm
- Mounting to PCB  $4 \times M3$  (not supplied)  
Recommended PCB hole  $\varnothing 5.3$  mm
- Fastening torque  $0.6$  N·m
- Connection to secondary 4 pins  $0.5 \times 0.25$  mm  
Recommended PCB hole  $\varnothing 0.7$  mm

### Remarks

- $U_{out}$  is positive when  $I_p$  flows in the direction of arrow.
- Temperature of the primary conductor should not exceed  $120$  °C.
- Must be mounted using PCB holes
- Installation of the transducer must be done, unless otherwise specified on the datasheet, according to LEM Transducer Generic Mounting Rules. Please refer to LEM document N°ANE120504 available on our Web site: <https://www.lem.com/en/file/3137/download/>

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