Current Transducer HMS 5..20-P

For the electronic measurement of currents: DC, AC, pulsed..., with galvanic isolation between the primary circuit (high power) and the secondary circuit (electronic circuit).

I_{PN} = 5 .. 20 A

All data are given with a R_L = 10 kΩ

Electrical data

Primary nominal current rms I_{PN} (A)	Primary current measuring range I_{PM} (A)	Primary Conductor Size x Turns (mm)	Type
5	± 15	0.65 x 1.6 x 4T	**HMS 05-P**
10	± 30	0.65 x 1.6 x 4T	**HMS 10-P**
15	± 45	1.2 x 2.2 x 2T	**HMS 15-P**
20	± 60	1.2 x 2.2 x 2T	**HMS 20-P**

V_{OUT}	Output voltage (Analog) @ I_P		V_{OE} ± (0.625·I_P/I_{PN})V	
G_{TH}	Theoretical sensitivity		0.625	V/I_{PN}
V_{REF}	Reference voltage [1] - Output voltage		2.5 ± 0.025	V
	V_{REF} Output impedance	typ.	200	Ω
	V_{REF} Load impedance		≥ 200	kΩ
R_L	Load resistance		≥ 2	kΩ
R_{OUT}	Output internal resistance		< 5	Ω
C_L	Capacitive loading		= 4.7	nF
V_C	Supply voltage (± 5 %) [3]		5	V
I_C	Current consumption @ V_C = 5 V		19	mA

Accuracy - Dynamic performance data

X	Accuracy [2] @ I_{PN} , T_A = 25°C		≤ ± 1	% of I_{PN}
ε_L	Linearity error 0 .. I_{PN}		≤ ± 0.5	% of I_{PN}
	.. 3 x I_{PN}		≤ ± 1	% of I_{PN}
TCV_{OUT}	Temperature coefficient of V_{OUT} @ I_P = 0		≤ ± 0.4	mV/K
TCV_{REF}	Temperature coefficient of V_{REF}	(25 .. 85 °C)	≤ ± 0.01	%/K
		(-40 .. 25 °C)	≤ ± 0.015	%/K
TCV_{OUT}/V_{REF}	Temperature coefficient of V_{OUT}/ V_{REF} @ I_P = 0		≤ ± 0.2	mV/K
TCG	Temperature coefficient of **G**		≤ ± 0.07	% of reading/K
V_{OE}	Electrical offset voltage @ I_P = 0, T_A = 25℃		V_{REF} ± 0.025	V
V_{OM}	Magnetic offset voltage @ I_P = 0, after an overload of 3 x $I_{PN\ DC}$		< ± 1.2	% of I_{PN}
t_{ra}	Reaction time @ 10 % of I_{PN}		< 3	µs
t_r	Response time to 90 % of I_{PN} step		< 5	µs
di/dt	di/dt accurately followed		> 50	A/µs
V_{no}	Output voltage noise	(DC .. 10kHz)	< 20	mVpp
		(DC .. 1MHz)	< 40	mVpp
BW	Frequency bandwidth (- 3 dB) [4]		DC .. 50	kHz

Notes : [1] It is possible to overdrive V_{REF} with an external reference voltage between 1.5V - 2.8V providing its ability to sink or source approximately 5 mA.

[2] Excluding offset and hysteresis.

[3] Maximum supply voltage (not operating) < 6.5 V

[4] Small signal only to avoid excessive heatings of the magnetic core.

Features

- Hall effect measuring principle
- Galvanic isolation between primary and secondary circuit
- Isolation test voltage 4300V
- Low power consumption
- Extremely low profile, 12mm
- Single power supply +5V
- Fixed offset & gain
- For SMT mounting

Advantages

- Small size and space saving
- Only one design for wide primary current range
- High immunity to external interference.
- V_{REF} pin with REF OUT & REF IN modes

Applications

- 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 HMS 5..20-P

General data

T_A	Ambient operating temperature		- 40 .. + 85	°C
T_S	Ambient storage temperature		- 40 .. + 85	°C
m	Mass	app.	6	g
	UL94 Classification		V0	
	Standard		EN 50178: 1997	

Isolation characteristics

V_b Rated isolation voltage rms
with IEC EN 50178, 61010-1 standards and following conditions
- Over voltage category III
- Pollution degree 2
- Heterogeneous field

	EN50178	IEC61010-1
Single isolation	1000V	1000V
Reinforced insulation	600V	300V

V_d	Rms voltage for AC isolation test, 50 Hz, 1 min	4.3	kV
dCp	Creepage distance	> 9.4	mm
dCl	Clearance distance	> 9.4	mm
CTI	Comparative tracking index (Group I)	> 600	V
V_e	Partial discharge extinction voltage rms @ 10 pC	> 750	V
$\hat{V}_w$	Impulse withstand voltage 1.2/50 µs	8	kV

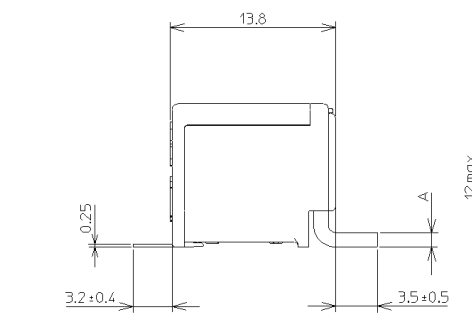
Safety

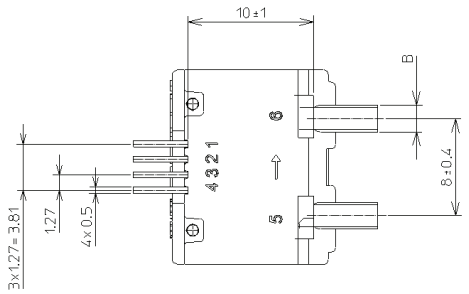
This transducer must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer's operating instructions.

Caution, risk of electrical shock

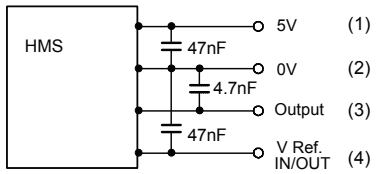
When operating the transducer, certain parts of the module can carry hazardous voltage (eg. primary busbar, power supply).
Ignoring this warning can lead to injury and/or cause serious damage.
This transducer is a built-in device, whose conducting parts must be inaccessible after installation.
A protective housing or additional shield could be used.
Main supply must be able to be disconnected.

Dimensions HMS 5..20-P (in mm. 1 mm = 0.0394 inch)

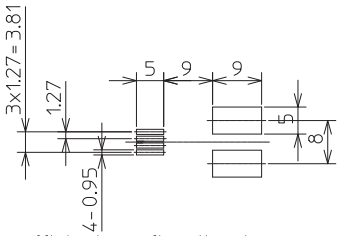




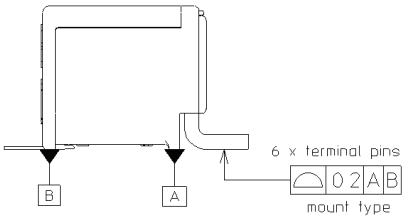
Recommended connection circuit



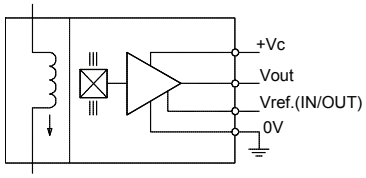
Recommended pattern



sufficient confirmation is necessary before use of this pattern



Operation Principle



	A	B	TURNS
HMS 05-P	0.65 t	1.6 w	4 t
HMS 10-P			
HMS 15-P	1.2 t	2.2 w	2 t
HMS 20-P			

Mechanical characteristics

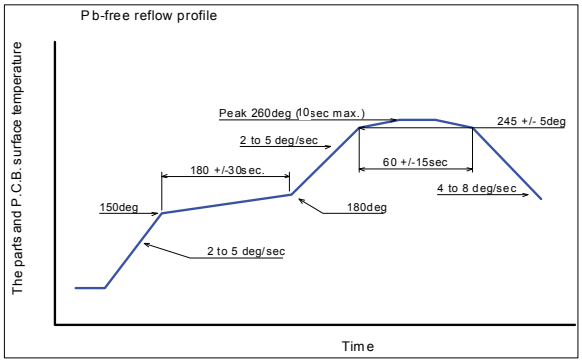
- General tolerance (unless otherwise stated) ± 0.5 mm

  Dimensions do not include deformation such as warp age.

Remarks

- V_{OUT} is positive when I_P flows from terminal 5 (IN) to terminal 6 (OUT).
- Temperature of the primary conductor should not exceed 100°C.

Solder reflow patterns



Current Transducer HMS 5..20-P

Handling Instructions

Notes for Storage, Handling and Mounting the transducer

Storage

(1) General storage conditions: Temperature 5 .. 30 °C Humidity 40 .. 60 %RH without dew condensation

(2) Storage period:

Storage period is within 1 year after production date in general storage conditions with dry pack dessicant.

According to MSL1 (Moisture Sensitivity Level 1) requirement.

(3) Containers must prevent electric static charge build up.

Note. For over storage periods of 1 year, the customer shall confirm the solderability of the part.

Handling and Mounting

(1) **Do not expose the transducer to shock or vibration.**

Damage caused by shock or vibration can lead to a failure of the transducer.

(2) **Do not wash the transducer.**

The HMS is a non-sealed type transducer. If liquids reach inside the transducer, it will cause migration or corrosion, which will influence the performance.

(3) **Thickness of the PCB should be more than 1.5 mm.**

If the thickness is not enough, the PCB tends to warp. It makes excessive tension on the transducer, which will influence the dynamic characteristics.

(4) **Be aware of the chucking force when mounting the transducer.**

When you use a machine for mounting the HMS transducer, make sure the chucking force is not too much because excessive force could cause damage to the parts inside the case, which will influence the dynamic characteristics of the transducer. Chucking force should not exceed 3 times the weight of the transducer.

(5) **Do not touch the lead pins with bare hands after they are taken out of the reel.**

Lead pins of HMS are Pb free parts. If the pins are touched by bare hands, they will oxidize faster, and that could cause soldering problems.

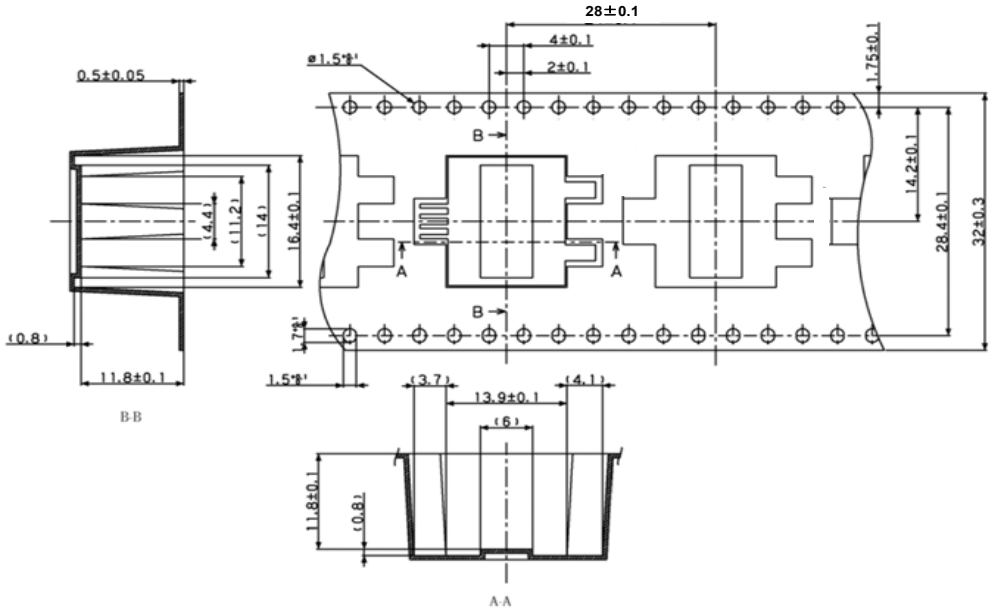
Do not use HMS transducer other than measuring current.

Taping Specification

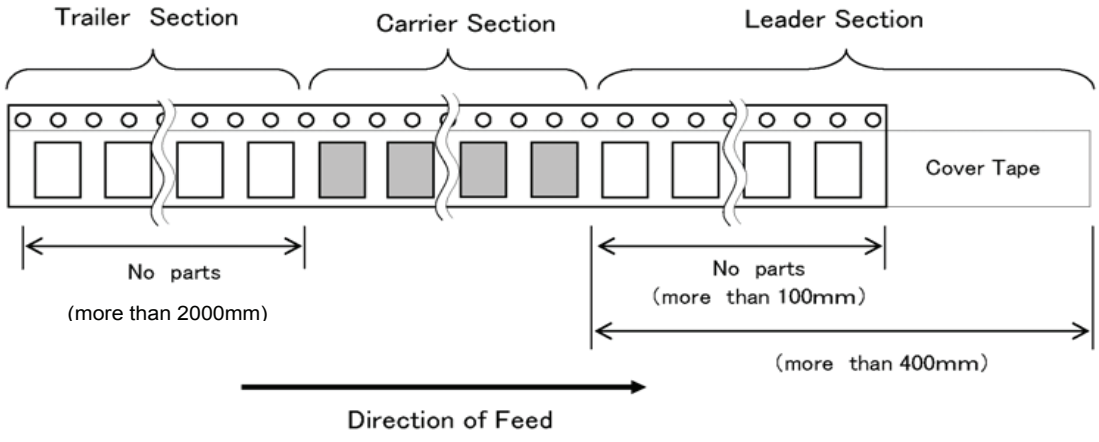
This Specification is according to JIS C 0806-3, EIA-481-D

(1) Emboss Tape

The following shows the shape and dimensions of the tape.

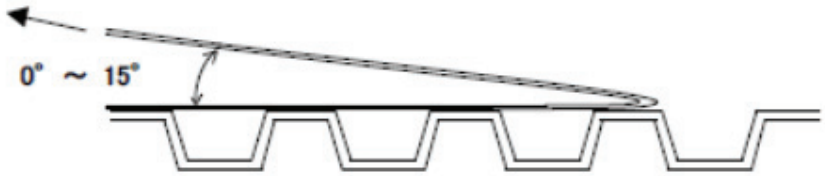


(2) Tapes at leader and trailer

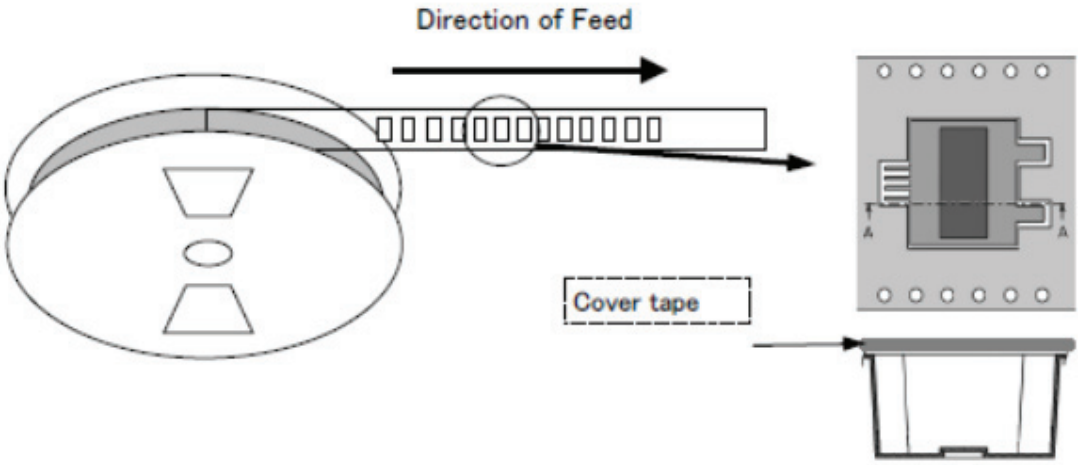


(3) The peel back force strength

Peel force : 0.2[N]~0.7[N]
Pulled at speed : 300[mm/min]

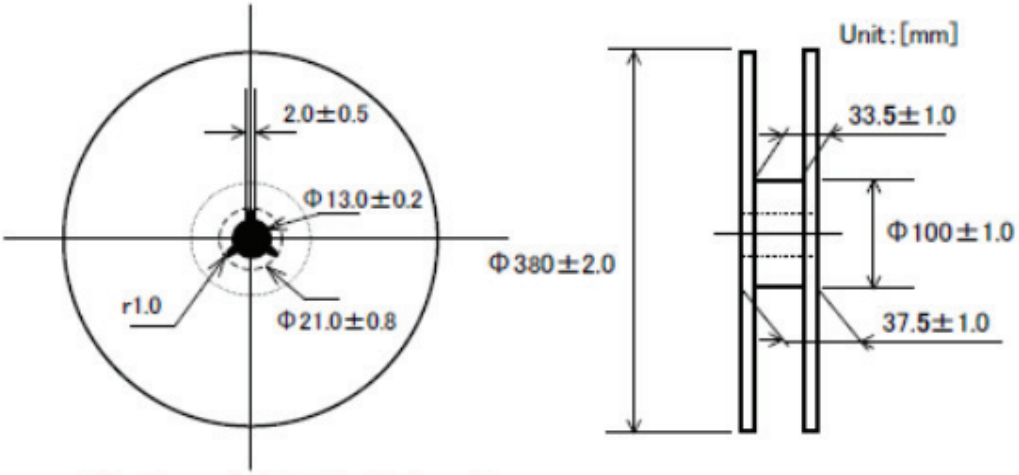


(4) Number of parts per winding reel is 150.



(5) Reel specifications

The following shows the shape and dimensions of the reel.



[Class] Anti-static plastic reel
[Material] Side plate : Polystyrene(PS)
Core : Polystyrene(PS)