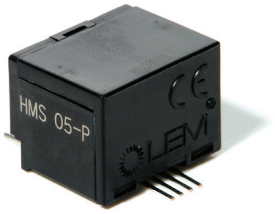
Current Transducer HMS 5 ... 20-P

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

I_{PN} = 5 ... 20 A



Electrical data

Primary nominal RMS current I_{PN} (A)	Primary current measuring range I_{PM} (A)	Primary Conductor Size × Turns (mm)	Type
5	±15	0.65 × 1.8 × 4T	**HMS 5-P**
10	±30	0.65 × 1.8 × 4T	**HMS 10-P**
15	±45	1.2 × 2.2 × 2T	**HMS 10-P**
20	±60	1.2 × 2.2 × 2T	**HMS 20-P**

U_{OUT}	Output voltage (Analog) @ I_{PN}		U_{OE} ± (0.625·I_P/I_{PN})	V
S_{Th}	External detection threshold sensitivity		0.625	V/I_P
U_{ref}	Reference voltage	[1] - Output voltage	2.5 ± 0.025	A
		U_{ref} Output impedance	typ. 200	Ω
		U_{ref} Load impedance	≥ 200	kΩ
R_L	Load resistance		≥ 2	kΩ
R_{OUT}	Output internal resistance		< 5	Ω
C_L	Load capacitance		= 4.7	nF
U_C	Supply voltage (± 5%) [2]		5	V
I_C	Current consumption @ U_C = 5 V		19	mA

Accuracy - Dynamic performance data

ε	Error [3] @ I_{PN}, T_A = 25 °C		≤ ±1	% of I_{PN}
ε_L	Linearity error	0 ... I_{PN}	≤ ±0.5	% of I_{PN}
		3 × I_{PN}	≤ ±1	% of I_{PN}
TCU_{out}	Temperature coefficient of U_{out} @ I_P = 0		≤ ±0.4	mV/K
TCU_{ref}	Temperature coefficient of U_{ref}	(25 ... 85°C)	≤ ±0.01	%/K
		(−40 ... 25°C)	≤ ±0.015	%/K
TCU_{out}/U_{ref}	Temperature coefficient of U_{out}/U_{ref} @ I_P = 0		≤ ±0.2	mV/K
TCS	Temperature coefficient of S		≤ ±0.07 % of reading /K	
U_{OE}	Electrical offset voltage @ I_P = 0, T_A = 25°C		U_{ref} ± 0.025	V
U_{OM}	Magnetic offset voltage @ I_P = 0, after an overload of 3 × $I_{PN\,DC}$		< ± 1.2	% of I_{PN}
$t_{D\,10}$	Delay time @ 10 % of I_{PN}		< 3	µs
$t_{D\,90}$	Delay time to 90 % of I_{PN} step [4]		< 5	µs
U_{no}	Output voltage noise (DC .. 10kHz)		< 20	mVpp
		(DC .. 1MHz)	< 40	mVpp
BW	Frequency bandwidth (− 3 dB) [5]		DC … 50	kHz

Notes:
[1] It is possible to overdrive U_{ref} with an external reference voltage between 1.5 V - 2.8 V providing its ability to sink or source approximately 5 mA.
[2] Maximum supply voltage (not operating) < 6.5 V
[3] Excluding offset and hysteresis
[4] For a di/dt = 50 A/µs
[5] Small signal only to avoid excessive heating of the magnetic core.

Features

- Open loop current transducer using the Hall effect
- Insulating plastic case recognized according to UL 94-V0.
- Galvanic insulation between primary and secondary circuit
- Isolation test voltage 4300 V
- Low power consumption
- Extremely low profile, 12 mm
- Single power supply +5 V
- Fixed offset & Sensitivity
- For SMT mounting.

Advantages

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

Applications

- AC variable speed drives and servo motor 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.

LEM International SA
Chemin des Aulx 8
1228 PLAN-LES-OUATES Switzerland
www.lem.com

General data

T_A	Ambient operating temperature	−40 … +85	°C
T_S	Ambient storage temperature	−40 … +85	°C
m	Mass	app. 6	g
	Standard(s)	EN 50178: 1997	

UL 508: Ratings and assumptions of certification

File # E189713 Volume: 2 Section: 1

Standards

- Standard for Industrial Control Equipment UL 508, Seventeeth Edition.
- Canadian Standard for Industrial Control Equipment CSA C22.2 No. 14-10, Eleventh Edition.

Ratings

Parameter	Symbol	Unit	Value
Primary involved potential		V AC/DC	600
Max surrounding air temperature	T_A	°C	85
Primary current	I_P	A	According to series primary currents
Secondary supply voltage	U_C	V DC	5
Output voltage	U_{out}	V	0 to 5

Conditions of acceptability

When installed in the end-use equipment, consideration shall be given to the following:

1. These devices must be mounted in a suitable end-use enclosure.

2. The terminals have not been evaluated for field wiring.

8. Low voltage circuits are intended to be powered by a circuit deried from an isolating source (such as transformer, optical isolator, limiting impedance or electro-mechanical relay) and having no direct connection back to the primary circuit (other than through the grounding means).

Marking

Only those products bearing the UL or UR Mark should be considered to be Listed or Recognired and covered under UL's Follow-Up Service. Always look for the Mark on the product.

LEM International SA
Chemin des Aulx 8
1228 PLAN-LES-OUATES Switzerland
www.lem.com

Insulation coordination

U_d	RMS voltage for AC insulation test, 50 Hz, 1 min	4.3	kV
U_{Ni}	Impulse withstand voltage 1.2/50 µs	8	kV
U_e	Partial discharge extinction RMS voltage @ 10 pC	> 750	V
d_{Cp}	Creepage distance	> 9.4	mm
d_{Cl}	Clearance	> 9.4	mm
CTI	Comparative tracking index (group I)	> 600	

Applications examples

	EN 50178	IEC 61010-1
d_{Cp}, d_{Cl}, U_{Ni}	Rated insulation voltage	Nominal voltage
Basic insulation	1000 V	1000 V
Reinforced insulation	600 V	300 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

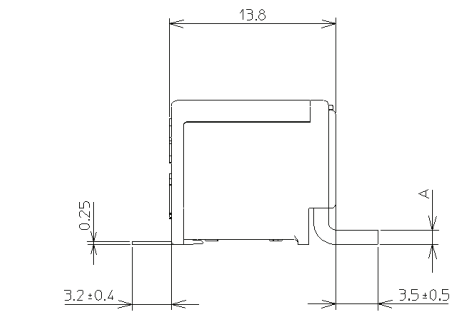
This tran*sducer* must be used in limited-energy secondary circuits according to IEC 61010-1.

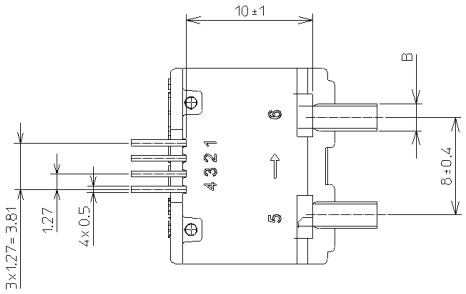
This transducer must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer's operating instructions.
Caution, risk of electrical shock
When operating the transducer, certain parts of the module can carry hazardous voltage (e.g. primary busbar, power supply). Ignoring this warning can lead to injury

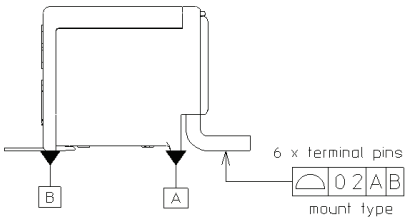
and/or cause serious damage.
This transducer is a build-in device, whose conducting parts must be inaccessible after installation. A protective housing or additional shield could be used.
Main supply must be able to be disconnected.

LEM International SA
Chemin des Aulx 8
1228 PLAN-LES-OUATES Switzerland
www.lem.com

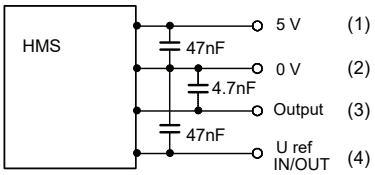
Dimensions HMS 5 ... 20-P (in mm. 1 mm =0.0394)



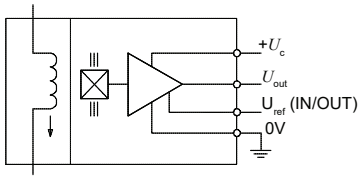




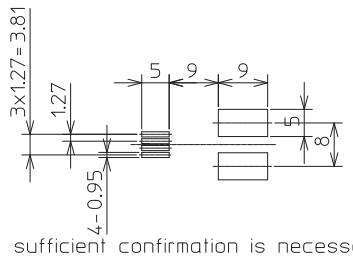
Recommended connection circuit



Operation Principle



Recommended pattern



sufficient confirmation is necessary before use of this pattern

	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			

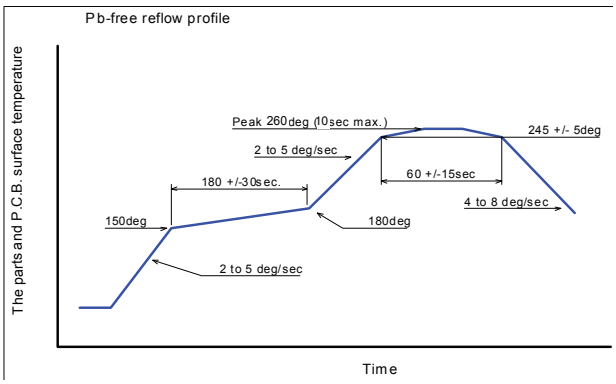
Mechanical characteristics

- General tolerance ± 0.5 mm
  Dimensions do not include deformation such as warp age.

Remarks

- U_{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.
- This is a standard model. For different versions (supply voltages, turns ratios, unidirectional measurements...), please contact us.

Solder reflow patterns



14November2019/ Version 14

LEM International SA
Chemin des Aulx 8
1228 PLAN-LES-OUATES Switzerland
www.lem.com

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.

14November2019/ Version 14

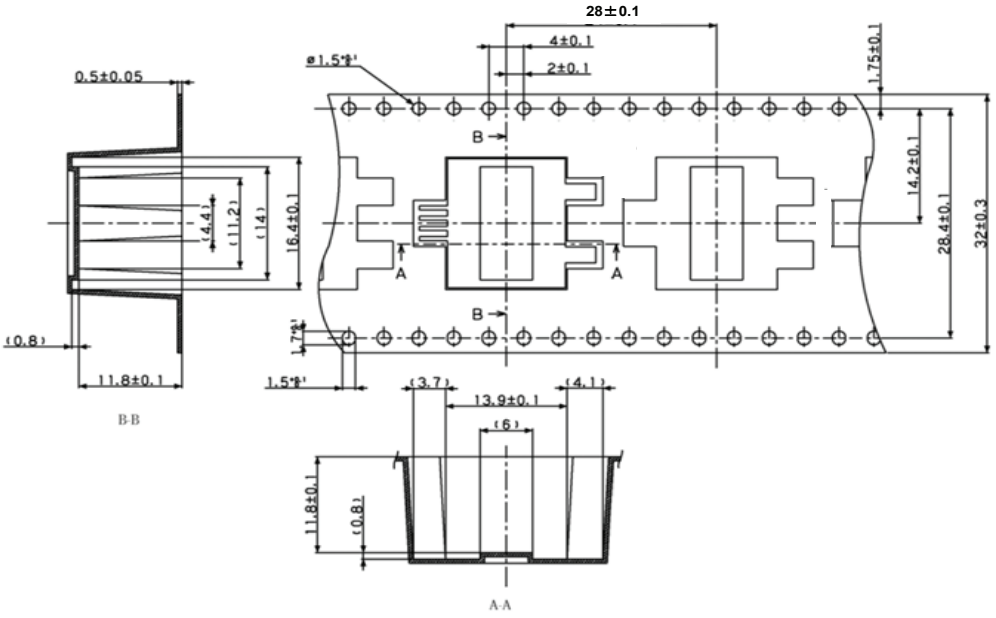
LEM International SA
Chemin des Aulx 8
1228 PLAN-LES-OUATES Switzerland
www.lem.com

Taping Specification

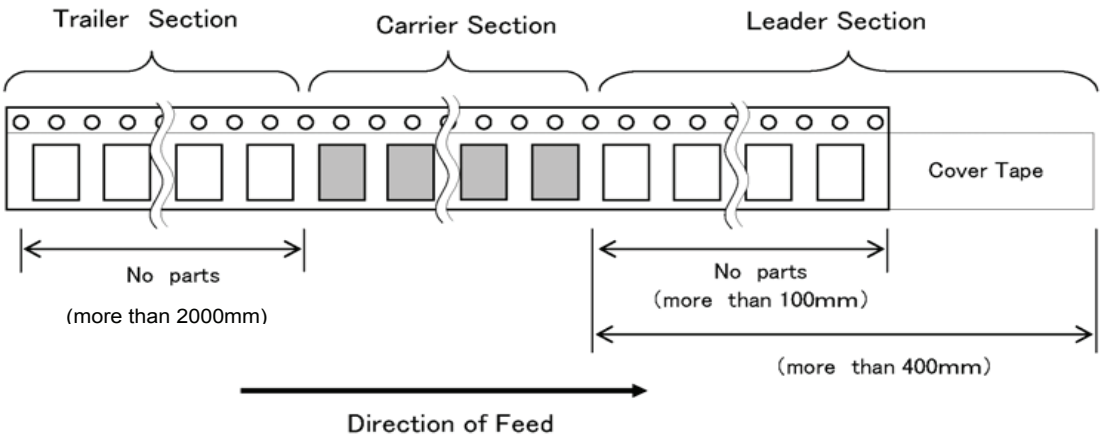
This Specification is according to JIS C 0806-3, EIA-481-D

(1) Emboss Tape

The following shows the shape and dimensions of the tape.



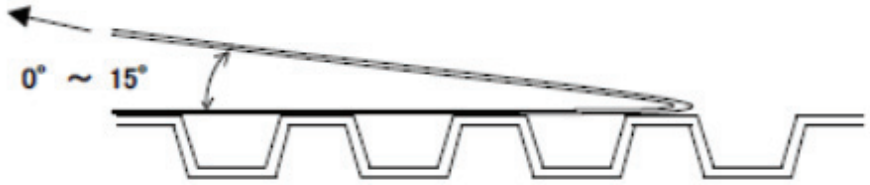
(2) Tapes at leader and trailer



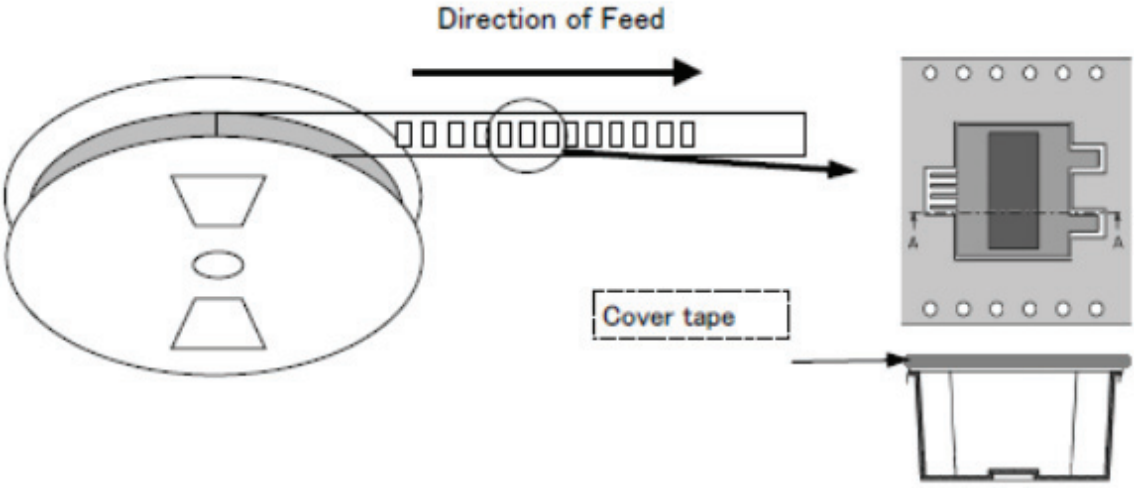
LEM International SA
Chemin des Aulx 8
1228 PLAN-LES-OUATES Switzerland
www.lem.com

(3) The peel back force strength

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

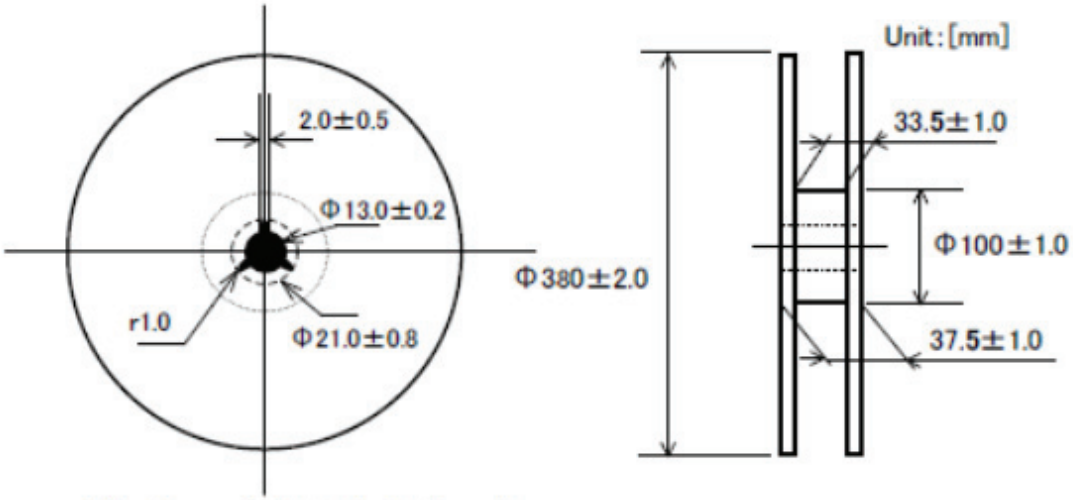


(4) Number of parts per winding reel is 150.



(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)

LEM International SA
Chemin des Aulx 8
1228 PLAN-LES-OUATES Switzerland
www.lem.com