

## Overview

KEMET's Langevin-type transducers are used wherever powerful ultrasonic waves must be generated. For application flexibility and ease of installation, these transducers are mounted in a structure that can be bolted virtually anywhere.

KEMET's high-performance ceramic material NEPEC® N-61 is excellent for use in these Langevin transducers. KEMET produces a number of this type of transducers, all featuring high quality and excellent output levels, and all based on a unique proprietary design.

## Applications

- Cleaning equipment
- Ultrasonic treatment machines
- Welders for plastic

## Benefits

- High mechanical Q and excellent electro-acoustic conversion efficiency, providing a high output amplitude
- High speed of vibration due to piezoelectric element
- Fast and easy installation
- High reliability
- Operating temperature range from -40°C to +120°C
- Good amplitude linearity due to N-61 ceramics' extended temperature range
- RoHS/REACH compliant

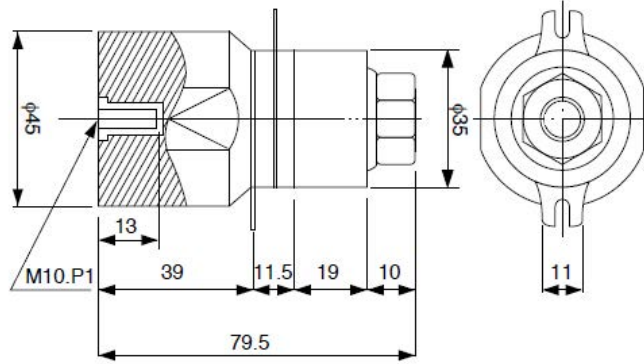


## Ordering Information

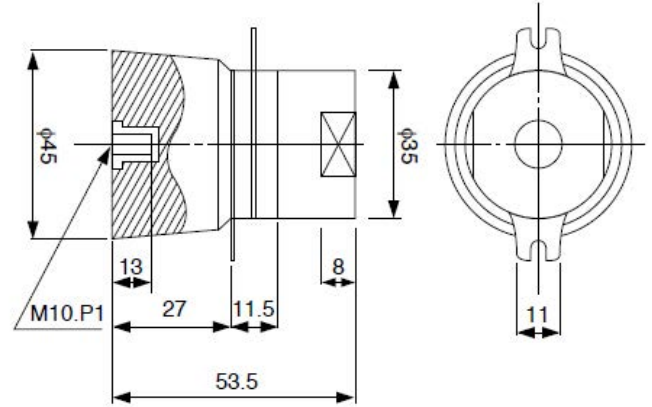
NBL	45	28	2	H	A	3
Series	Diameter of Acoustic Wave Radiation	Resonant Frequency	Number of Piezoelectric Elements	Construction Type	Radiation Surface	Model Type
NBL	15 = $\varnothing$ 15 mm 20 = $\varnothing$ 20 mm 45 = $\varnothing$ 45 mm	28 = 28 kHz 40 = 40.2 kHz 60 = 60 kHz	2 = 2 elements	H = Horn construction (output surface has step or horn shape) S = Straight construction	Blank = Not available for treatment machines type A = Threaded type for cleaning equipment	Blank 3

**Dimensions in mm**

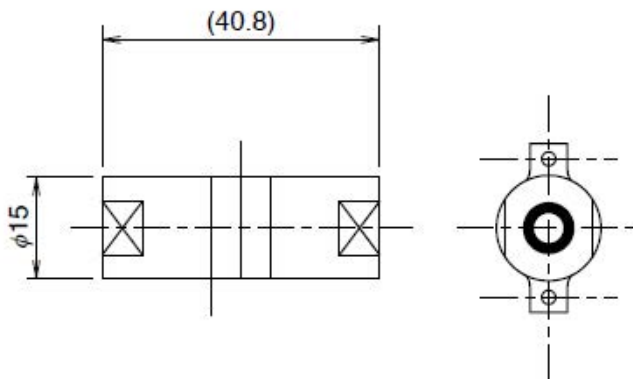
NBL45282H-A3



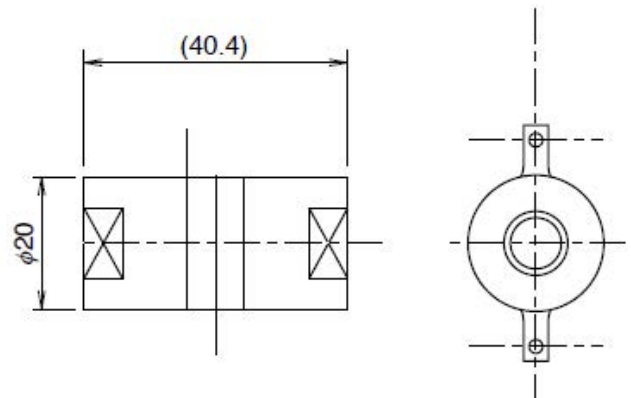
NBL45402H-A



NBL15602S



NBL20602S



## Environmental Compliance

All KEMET Piezoelectric Transducers are RoHS and REACH compliant.

Article 33(1) of the REACH Regulation states that manufacturers and importers of articles (products) are required to notify their customers of the presence of any Substances of Very High Concern (SVHC) in their products exceeding 0.1% by weight and provide instructions on safe use of the product.

KEMET Corporation reports regarding the Article 33(1) of REACH Regulation as follows:

1. Applicable Product:

Piezoelectric transducers (NBL Series).

2. Report for content of REACH SVHC list:

The product(s) above contain a substance by more than 0.1wt% per product weight that was published in the 8th update of the REACH SVHC substances (December 19, 2012).

3. Regarding safety of the piezoelectric transducers (Piezoceramic products):

The Piezoceramic that is used in this product becomes ceramic by sintering powder containing PZT as a main ingredient. It is chemically stable, with minimum risks toward the human body or environment within the intended use of the product. Please note that risks could occur in the case of inhalation or accidental oral uptake of powder ceramics.

4. Technical product information on the piezoelectric transducers (Piezoceramic products):

The manufacturing technique of the “piezoceramic products” whose main ingredient is Lead Titanium Zirconium Oxide (PZT) has been established, and there is no alternative material that can exhibit superior performance than PZT at this moment. Please note that the piezoceramic is listed as an exempt on RoHS (2011/65/EU) Annex III (7c.1).

5. Responsibility of piezoceramic manufacturers:

Piezoceramic manufacturers report information regarding PZT containment in their products to the customers to obey the article 33 of the REACH regulation.



## Performance Characteristics

Item	Performance Characteristics
Operating Temperature Range	-40 to +120°C
Recommended Storage Condition	-20 to +80°C
Resonant Frequency Range	28 – 60 kHz
Maximum Allowable Power Range	2.5 – 50.0 W

**Table 1 – Ratings & Part Number Reference**

Part Number	Resonant Frequency (kHz)	Dynamic Admittance (mS)	Mechanical Q	Static Capacitance (pF)	Maximum Allowable Velocity (cm/S)	Maximum Allowable Power (W)	Application	Horn Plate	Backing Plate	Weight (g)
NBL45282H-A3	28.0	40	500	4,000	40	50 <sup>1</sup>	Cleaning equipment	Aluminium	Stainless Steel	400
NBL45402H-A	40.2	15	500	4,000	50	50 <sup>1</sup>	Cleaning equipment	Aluminium	Stainless Steel	240
NBL15602S	60.0	25	500	850	50	2.5 <sup>2</sup>	Treatment machines	Aluminium	Aluminium	30
NBL20602S	60.0	20	400	1,250	40	3.7 <sup>2</sup>	Treatment machines	Aluminium	Aluminium	35

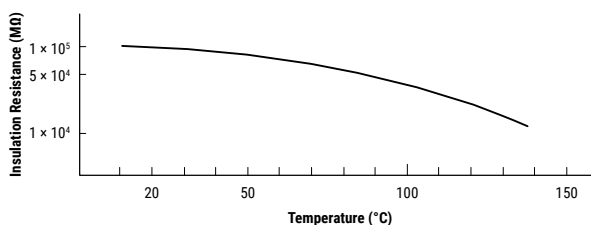
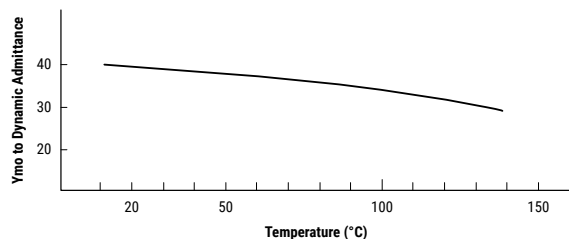
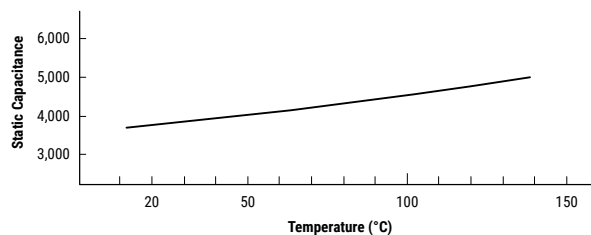
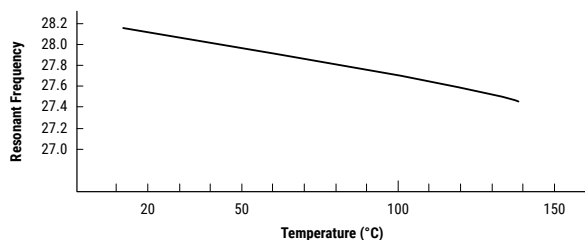
<sup>1</sup> Maximum allowable power based on data where one unit is measured with a water load on one side.

<sup>2</sup> Maximum allowable input in no-load state.

## Electrical Characteristics

### Temperature Characteristics

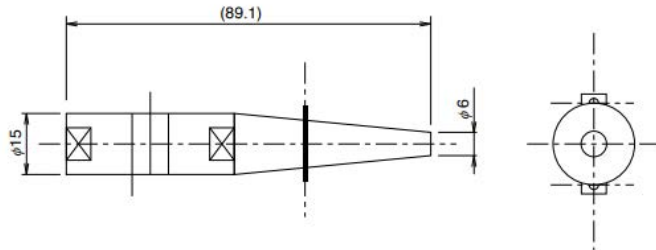
#### NBL45282H-A3 & NBL45402H-A



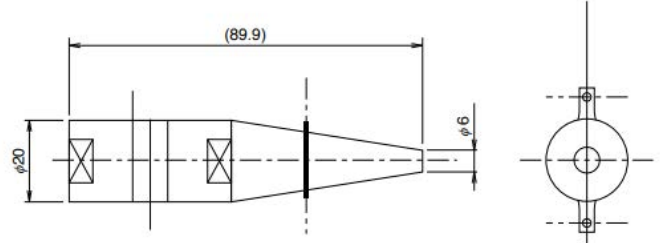
## Electrical Characteristics cont.

### Horn Installation Reference Example

NBL15602S

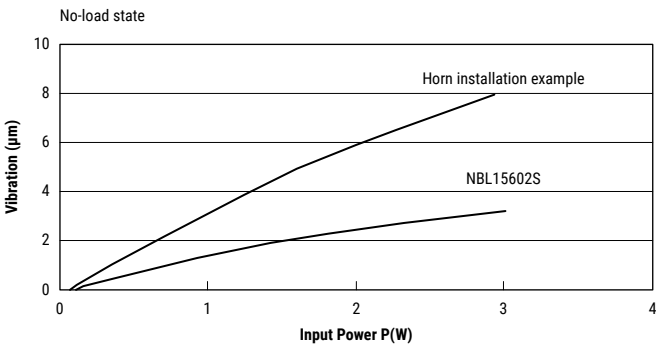


NBL20602S

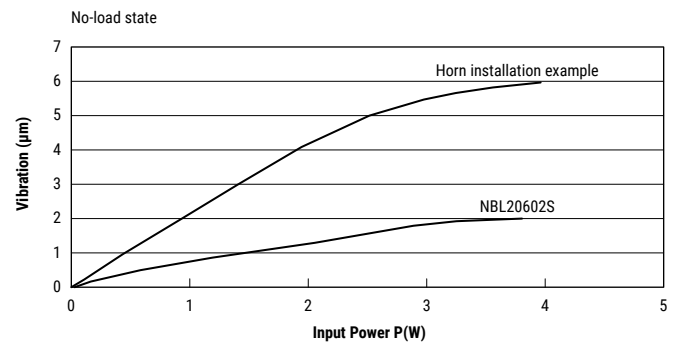


### Vibration

NBL15602S



NBL20602S



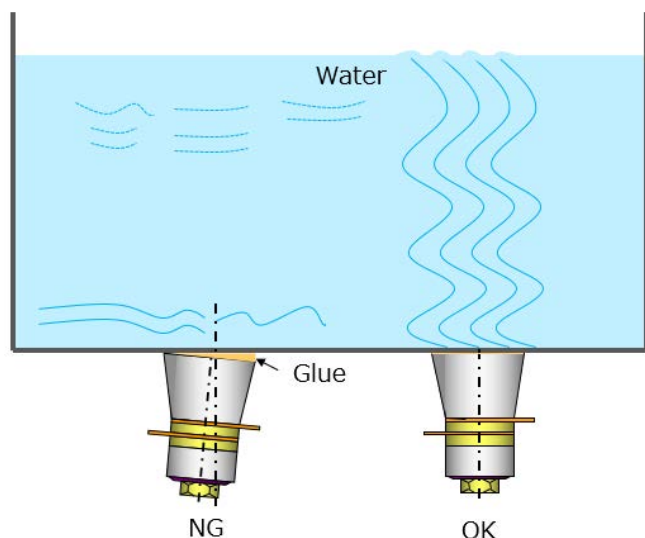
## Packaging

Part Type	Packaging Type	Pieces per Box
NBL45282H-A3	Tray	30
NBL45402H-A		
NBL15602S		160
NBL20602S		

## Handling Precautions

### Precautions to be taken when using piezoelectric transducers (Please read these precautions before using our products)

Material selection, installation and activation of piezoelectric ceramics should be decided upon by users according to the applications. For proper evaluation and decision, products should be tested repeatedly in both realistic and abnormal operating conditions.



- Do not disassemble the product or remove the screw.
- Avoid excessive physical shock. Otherwise, the internal piezoelectric ceramic element may be damaged.
- Do not apply power exceeding its maximum allowance.
- Store the transducers preferably at ordinary temperatures (-20°C to +80°C). Avoid condensation on the product's surface.
- Handle products properly as industrial waste. When disposing, please contact your local waste disposal service and make sure the disposal methods meet all legal requirements.
- Transducers' stock should be used promptly, preferably within 1 year of receipt.

## Export Control

### For customers in Japan

For products which are controlled items subject to the "Foreign Exchange and Foreign Trade Law" of Japan, the export license specified by the law is required for export.

### For customers outside Japan

Piezoelectric Transducers should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles), or any other weapons.

## KEMET Electronics Corporation Sales Offices

For a complete list of our global sales offices, please visit [www.kemet.com/sales](http://www.kemet.com/sales).

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### Disclaimer

All product specifications, statements, information and data (collectively, the "Information") in this datasheet are subject to change. The customer is responsible for checking and verifying the extent to which the Information contained in this publication is applicable to an order at the time the order is placed. All Information given herein is believed to be accurate and reliable, but it is presented without guarantee, warranty, or responsibility of any kind, expressed or implied.

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Although KEMET designs and manufactures its products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.

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