

## High Resolution Transducer for Outer-Tube Inspection

### ORx OSx Series

#### Wide Beam width & Electric Scanning

The **ORx** Series presents the world's first feeding speed with testing full-cross-section, simultaneous flaw detection and/or thickness measurement by surrounding the outer surface of a target tube with curve-fit crystals.

Composite/polymer crystals with a resonance frequency ranging from 5 to 140 MHz are applied to achieve a high-resolution crack-detection transducer. Products range: the Angle Beam Transducer Series **ORA** for transversal cracks and **OSA** for longitudinal cracks and , Straight Beam Transducer Series **ORN** for tube-thickness measurements.

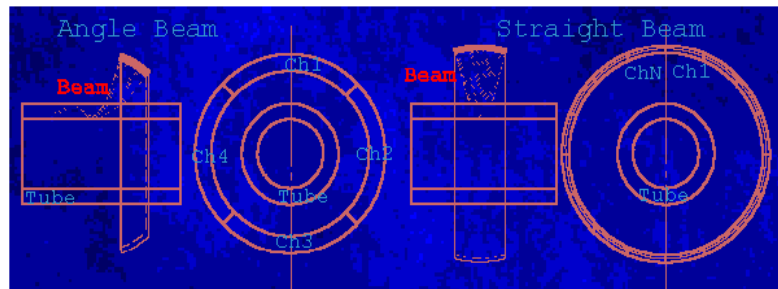
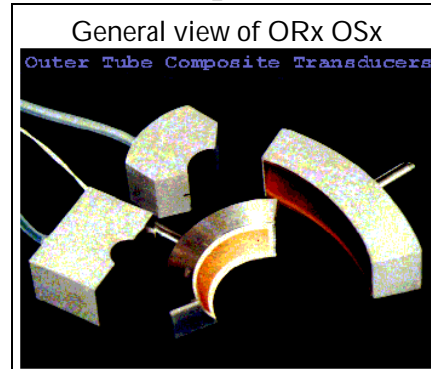
These series apply line-focus parallel to the target tube-surface, thus providing high resolution and detection features.

The **ORD** and **OSD** series is similar as ORA and OSA series but with delay-line for contact application or to avoid mechanical damage (longer life time).

All transducers are made by composite/polymer crystals with curve-fit shape. The effective beam width has been dramatically improved compared to typical ceramic flat crystals. A typical beam width is over 90 degree. Only 4 or 5 transducers cover 360 degree.

#### Technical Data

| No. | Description              | Specification                      |
|-----|--------------------------|------------------------------------|
| 1   | Piezoelectric material   | 0-3composite or P(VCN/VAc) polymer |
| 2   | Frequency range          | 5...20MHz or 20...140MHz           |
| 3   | Tube Diameter            | 1...200mm                          |
| 4   | Beam width               | 15...100degree                     |
| 5   | Focus length             | Down to 4mmR                       |
| 6   | Focus shape              | Line focused                       |
| 7   | Crystals in a transducer | 1 as standard, Optionally 1...16ch |
| 8   | Housing                  | Designed for each application      |
| 9   | Cable                    | RG174U or 1.5mm dia.Coax.          |
| 10  | Connector                | Microdot, LEMO,BNC                 |



#### Standard Transducer

| Tube Diameter (mm dia.)*1 | Resonance Frequency (MHz) | Refraction angle (degree) *2 | Effective beam angle (degree) | Delay line | Number to cover 360 degree | Type                     |
|---------------------------|---------------------------|------------------------------|-------------------------------|------------|----------------------------|--------------------------|
| 32...70                   | 10                        | 45                           | 50                            | with       | 8                          | <b>8-10C-L50R-ORD90</b>  |
| 32...70                   | 10                        | 45                           | 50                            | without    | 8                          | <b>8-10C-L50R-ORA90</b>  |
| 32...70                   | 10                        | 45*3                         | 25                            | without    | 16                         | <b>16-10C-L50R-OSA90</b> |

|          |    |                  |                  |         |    |  |
|----------|----|------------------|------------------|---------|----|--|
| 20...50  | 10 | 45               | 100              | without | 4  | <b>4-10C-L35R-ORA65</b>                |
| 20...50  | 10 | 45               | 100              | with    | 4  | <b>4-10C-L35R-ORD65</b>                |
| 20...50  | 10 | 45 <sup>*3</sup> | 35               | without | 12 | <b>12-10C-L35R-OSA65</b>               |
| 10...32  | 15 | 45               | 100              | without | 4  | <b>4-15C-L25R-ORA40</b>                |
| 10...32  | 15 | 45               | 100              | with    | 4  | <b>4-15C-L25R-ORD40</b>                |
| 10...32  | 15 | 45 <sup>*3</sup> | 50               | without | 8  | <b>8-15C-L25R-OSA40</b>                |
| 5...10   | 20 | 45               | 100              | without | 4  | <b>4-20C-L15R-ORA15</b>                |
| 5...10   | 20 | 45               | 100              | with    | 4  | <b>4-20C-L15R-ORD15</b>                |
| 5...10   | 20 | 45 <sup>*3</sup> | 50               | without | 8  | <b>8-20C-L15R-OSA15</b>                |
| 30...50  | 10 | 0                | 90 <sup>*4</sup> | without | 8  | <b>8/32-10C-L35R-ORN50</b>             |
| 15...30  | 15 | 0                | 90 <sup>*5</sup> | without | 4  | <b>4/16-15C-L25R-ORN30</b>             |
| 5...15   | 20 | 0                | 90 <sup>*6</sup> | without | 3  | <b>3/12-20C-L25R-ORN15</b>             |
| 5...15   | 20 | 0                | 90 <sup>*6</sup> | with    | 2  | <b>2/6-20C-L25R-ORND15</b>             |
| 10...110 | 10 | 0                | 60 <sup>*4</sup> | with    | 6  | <b>6-10C-L37R-ORN150<sup>*7</sup></b>  |
| 20...225 | 10 | 0                | 30 <sup>*4</sup> | with    | 12 | <b>12-10C-L70R-ORN225<sup>*7</sup></b> |
| 32...250 | 10 | 0                | 30 <sup>*4</sup> | with    | 12 | <b>12-10C-L70R-ORN310<sup>*7</sup></b> |

\*1: Diameter range is just as reference, each transducers can test smaller diameter tubes than minimum.

\*2: Refraction angle for steel. User can define the incident angle for each application.

\*3: beam direction is transversal for longitudinal flaw detection.

\*4, \*5, \*6: These are not effective beam width. \*4:8 elements in a transducer. \*5: 4 elements in a transducer \*6: 3 elements in a transducer

\*7: Our favorite products

The appearance and specifications are subject to change for modifications without notice.

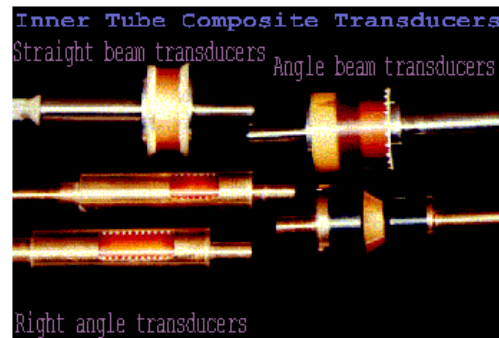
### Customized assembly:

Customized assembly also available for various applications.

- Decreased pitch of crystal to increase channel number.
- Products customized for small radius targets to a minimum 1 mm dia.
- Intentionally unbalanced crystal widths.
- Optimum focal distance to a given material or thickness.
- Recalculated incident angle for target material other than steel.
- Application of fine parallel beam method based on delay line.

### Related products:

- Array Drivers MUX and MXA series as multiplexer with any ultrasonic equipment.
- Fastest Tube/Bar Testing System **OTST**
- Inner Tube Transducer IRx Series
- Fine focused Transducer for Inner Tube testing.



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