

# INDUCTION HEATERS

## BETEX MF Quick-Heaters – middle-frequency technology

*Mounting, dismantling and preheating of metal components*

Induction generators with medium frequency technology are suitable not only for thermal assembly, but also for disassembly. By using medium frequency technology, energy is effectively transferred to the workpiece, heating it easily and quickly. The MF Quick-Heater consists of a generator with a fixed or flexible inductor. Its compact dimensions make it easy to move.

BETEX MF Quick-Heaters result in time savings as they can be deployed very rapidly (fewer actions) and heat faster than conventional methods. Energy use is much more efficient thanks to its lower power consumption. One of the major advantages of this type of induction heater is that they are not limited to components with a cylindrical shape: flexible inductors can be wound around any size or shape. This makes it possible to heat very large and heavy components.

### Advantages of BETEX MF Quick-Heaters

- ✓ For mounting, dismantling and preheating
- ✓ Suitable for steel, cast iron, stainless steel and titanium
- ✓ Temperature and/or time controlled heating
- ✓ Double temperature measurement ( $\Delta T$  monitoring)
- ✓ Low connection power (32/63 Amp)
- ✓ Generators are adjustable from 2.5 to 3.5/10/22/44 kW
- ✓ Easy to use and flexible
- ✓ Suitable for production and maintenance applications
- ✓ No residual magnetism
- ✓ No fire hazard due to open flames
- ✓ No noise, fumes or smoke nuisance
- ✓ Air-cooled: no water cooling needed
- ✓ Because the work is carried out damage-free, expensive components can be reused
- ✓ A flexible or fixed inductor is recommended depending on the application



### To be used for

- Bearings
- Labyrinth seals
- Bearing rings
- Bearing housings
- Gear wheels
- Rollers
- Tubes
- Bushings
- Couplings
- Train wheels/train wheel tyres
- Extruders
- Stator housings

### The BETEX MF Quick-Heater

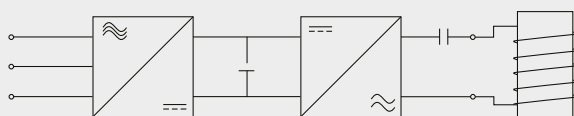
This heater consists of a generator and one or more inductors. The generator is designed for the connection of inductors used for heating ferromagnetic workpieces. Suitable materials include iron, steel, stainless steel, titanium and certain bronze alloys. The maximum capacity workpieces can be subjected to is 3.5, 10, 22 kW or 44 kW, depending on the type of heater.

### Operating principle

The three-phase voltage is rectified and smoothed. This rectified voltage is then converted by means of an inverter into an AC voltage with a frequency between

10 and 25 kHz. The power is then applied to the workpiece magnetically via a 'resonance capacitor' using an inductor (coil).

Since the frequency is relatively high, the penetration depth of the magnetic field is not too large, so that only the outer layer of the workpiece is heated. This principle makes heating using medium-frequency particularly suitable for dismantling purposes, such as removing bearing rings from shafts.



### Testing

For special applications, we can carry out tests in advance with components that the client provides for this purpose.

If necessary, we can supply a customised application. For standard applications, we have a large database with examples. We also use simulation programmes.

By supplying optimum solutions, we achieve significant savings. In fact, measurable savings are guaranteed simply by working damage-free and hence, being able to reuse the parts.

# INDUCTION HEATERS

Middle-frequency heating methods

## Fixed inductor around the workpiece

Energy input from outside to inside. For dismounting of, for example, bearing rings, labyrinth rings, pipes and rings.



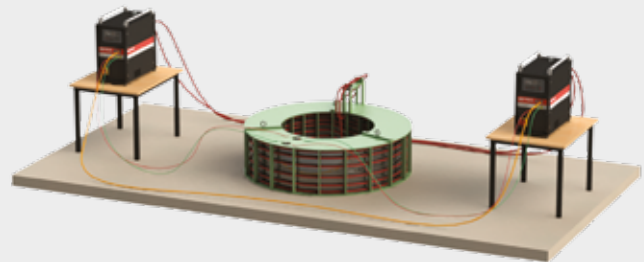
## Fixed inductor in the workpiece

Heating a bore for bearing or shaft mounting.



## Fixed inductor in and around the workpiece

For stress-free mounting of a bearing, two coupled generators are used. Inner and outer ring are heated simultaneously.



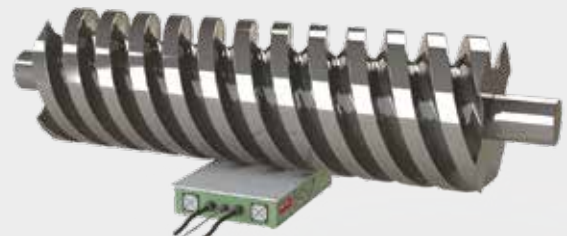
## Pin inductor in the workpiece

Heating a bore for example for bearing or shaft mounting.



## Table inductor

Local preheating for laser cladding.



# INDUCTION HEATERS

## Middle-frequency projects



**BETEX 3.0, 22 kW**

Mounting of wheels in an elevator plant using pin inductors. For this client, custom inductors were made, with the required lengths and diameters.



**BETEX 3.0, 22 kW**

Dismounting in a steel factory, using a flexible inductor wrapped around a bearing ring.

Temperature: 200°C  
Time needed: 17 min.



**BETEX 3.0, 44 kW**

Dismounting of a coupling at a gearbox repair company.

Temperature: 100°C  
Time needed: 7 min.



**BETEX 3.0, 22 kW**

Preheating in preparation for laser cladding.

# INDUCTION HEATERS

## BETEX MF Quick-Heater 3.0 - 3,5kW

New



**ΔT**

Delta T

**3,5**  
power kW

**4,3"**  
display inch

**230**  
voltagess V

### BETEX MF Quick-Heater 3.0 - 3,5kW

- Portable induction heater, weighs only 7,85 kg, ideal for working on site.
- Easy to connect to mains voltage (230V)
- Easy operation with 4,3" touchscreen
- Smart electronics ensure optimal operating frequency
- Dual temperature sensing (monitoring Delta T)
- Choice of flexible inductors: 5m, 7,5m, 10m (Not included)
- Can heat according to preset temperature/time curve
- The heating process is displayed in a clear graph
- Create proof of work report
- Log function to save data or export it via a USB port

**ΔT**

#### For more control and stress-free mounting

Thanks to the Delta-T ΔT monitoring, it is possible to measure the internal and external temperature of a workpiece with 2 temperature probes. Thus the maximum preset temperature difference between 2 points can never be exceeded. This achieves even and uniform heating and prevents material stress.



**Flexible inductor 180°C**

Type	MF Quick-Heater 3.0, 3,5kW
Power	3,5kW
Voltage/Amperage	230V / 13A* 230V / 16A**
Heat curve in display	Yes
Setpoint power	No
Setpoint temperature	Yes, via touchscreen
Setpoint temperature curve	Yes, via touchscreen
Setpoint timer	Yes, via touchscreen
Inductor recognition	No
USB connection	Yes
Network connection	No
Heating log	Yes
Weight generator	7,85 kg



**Log function and export to USB stick (USB stick not included)**

See page 46 for detailed technical specifications. \*UKCA model specifications. \*\* CE model specifications.



# INDUCTION HEATERS

## BETEX MF Quick-Heater 2.5 & 3.0 - 10kW



**10**  
power kW

**3.5"**  
display inch

**400/450/  
500/600**  
voltages V

### BETEX MF Quick-Heater 2.5 - 10kW

- Compact design with 3.5" display
- User-friendly touchscreen operation
- Smart electronics ensure optimum operating frequency
- Adjustable power regulation
- Double temperature measurement ( $\Delta T$  monitoring)
- Choice between fixed and flexible inductors

Type	MF Quick-Heater 2.5, 10kW	MF Quick-Heater 3.0, 10kW
Power	10kW	10kW
Voltage/Amperage	3~400V/16A 3~450V/14A 3~500V-12A 3~600V-10A	3~400V/16A 3~450V/14A 3~500V-12A 3~600V-10A
Heat curve in display	No	Yes
Setpoint power	Yes, via touchscreen	Yes, via touchscreen
Setpoint temperature	Yes, via touchscreen	Yes, via touchscreen
Setpoint temperature curve	No	Yes, via touchscreen
Setpoint timer	Yes, via touchscreen	Yes, via touchscreen
Inductor recognition	Yes	Yes
USB connection	No	Yes
Network connection	No	Yes
Heating log	No	Yes
Weight generator	46 kg	46 kg

See page 46 for detailed technical specifications.



**10**  
power kW

**7"**  
display inch

**400/450/  
500/600**  
voltages V

**SMART inductor recognition**  
The desired temperature and desired power do not have to be set if an inductor with identification feature is connected. In this case the generator automatically adopts the settings defined in the program (1, 2 or 3) for the corresponding inductor.

### BETEX MF Quick-Heater 3.0 - 10kW

- Compact design with 7" display
- User-friendly touchscreen operation
- Smart electronics ensure optimum operating frequency
- Adjustable power regulation
- Double temperature measurement ( $\Delta T$  monitoring)
- Choice between fixed and flexible inductors
- Can heat according to preset temperature/time curve
- The heating process is displayed in a clear graph
- Create proof of work report
- Log function to save data or export it via a USB port



#### For more control and stress-free mounting

Thanks to the Delta-T  $\Delta T$  monitoring, it is possible to measure the internal and external temperature of a workpiece with 2 temperature probes. Thus the maximum preset temperature difference between 2 points can never be exceeded. This achieves even and uniform heating and prevents material stress.



The MF 3.0 has a 7" touchscreen



Optional signal tower for MF 2.5 and 3.0

# INDUCTION HEATERS

## BETEX MF Quick-Heater 2.5 & 3.0 - 22kW



**22**  
power kW

**3.5"**  
display inch

**400/450/  
500/600**  
voltages V

### BETEX MF Quick-Heater 2.5 - 22kW

- Compact design with 3.5" display
- User-friendly touchscreen operation
- Smart electronics ensure optimum operating frequency
- Adjustable power regulation
- Double temperature measurement ( $\Delta T$  monitoring)
- Choice between fixed and flexible inductors

Type	MF Quick-Heater 2.5, 22kW	MF Quick-Heater 3.0, 22kW
Power	22kW	22kW
Voltage/Amperage	3 ~ 400V-32A 3 ~ 450V-30A 3 ~ 500V-28A 3 ~ 600V-23A	3 ~ 400V-32A 3 ~ 450V-30A 3 ~ 500V-28A 3 ~ 600V-23A
Heat curve in display	No	Yes
Setpoint power	Yes, via touchscreen	Yes, via touchscreen
Setpoint temperature	Yes, via touchscreen	Yes, via touchscreen
Setpoint temperature curve	No	Yes, via touchscreen
Setpoint timer	Yes, via touchscreen	Yes, via touchscreen
Inductor recognition	Yes	Yes
USB connection	No	Yes
Network connection	No	Yes
Heating log	No	Yes
Weight generator	46 kg	46 kg

See page 46 for detailed technical specifications.



**22**  
power kW

**7"**  
display inch

**400/450/  
500/600**  
voltages V

**SMART inductor recognition**  
The desired temperature and desired power do not have to be set if an inductor with identification feature is connected. In this case the generator automatically adopts the settings defined in the program (1, 2 or 3) for the corresponding inductor.

### BETEX MF Quick-Heater 3.0 - 22kW

- Compact design with 7" display
- User-friendly touchscreen operation
- Smart electronics ensure optimum operating frequency
- Adjustable power regulation
- Double temperature measurement ( $\Delta T$  monitoring)
- Choice between fixed and flexible inductors
- Can heat according to preset temperature/time curve
- The heating process is displayed in a clear graph
- Create proof of work report
- Log function to save data or export it via a USB port



#### For more control and stress-free mounting

Thanks to the Delta-T  $\Delta T$  monitoring, it is possible to measure the internal and external temperature of a workpiece with 2 temperature probes. Thus the maximum preset temperature difference between 2 points can never be exceeded. This achieves even and uniform heating and prevents material stress.



The MF 3.0 has a 7" touchscreen



Optional signal tower for MF 2.5 and 3.0



# INDUCTION HEATERS

## BETEX MF Quick-Heater 2.5 & 3.0 - 44kW



**44**  
power kW

**3.5"**  
display inch

**400/450/  
500/600**  
voltages V

### BETEX MF Quick-Heater 2.5 - 44kW

- Compact design with 3.5" display
- User-friendly touchscreen operation
- Smart electronics ensure optimum operating frequency
- Adjustable power regulation
- Double temperature measurement ( $\Delta T$  monitoring)
- Choice between fixed and flexible inductors

Type	MF Quick-Heater 2.5, 44kW	MF Quick-Heater 3.0, 44kW
Power	44kW	44kW
Voltage/Amperage	3 ~ 400V-63A 3 ~ 450V-59A 3 ~ 500V-55A 3 ~ 600V-45A	3 ~ 400V-63A 3 ~ 450V-59A 3 ~ 500V-55A 3 ~ 600V-45A
Heat curve in display	No	Yes
Setpoint power	Yes, via touchscreen	Yes, via touchscreen
Setpoint temperature	Yes, via touchscreen	Yes, via touchscreen
Setpoint temperature curve	No	Yes, via touchscreen
Setpoint timer	Yes, via touchscreen	Yes, via touchscreen
Inductor recognition	Yes	Yes
USB connection	No	Yes
Network connection	No	Yes
Heating log	No	Yes
Weight generator	78 kg	78 kg

See page 46 for detailed technical specifications.



**44**  
power kW

**7"**  
display inch

**400/450/  
500/600**  
voltages V

**SMART inductor recognition**  
The desired temperature and desired power do not have to be set if an inductor with identification feature is connected. In this case the generator automatically adopts the settings defined in the program (1, 2 or 3) for the corresponding inductor.

### BETEX MF Quick-Heater 3.0 - 44kW

- Compact design with 7" display
- User-friendly touchscreen operation
- Smart electronics ensure optimum operating frequency
- Adjustable power regulation
- Double temperature measurement ( $\Delta T$  monitoring)
- Choice between fixed and flexible inductors
- Can heat according to preset temperature/time curve
- The heating process is displayed in a clear graph
- Create proof of work report
- Log function to save data or export it via a USB port



#### For more control and stress-free mounting

Thanks to the Delta-T  $\Delta T$  monitoring, it is possible to measure the internal and external temperature of a workpiece with 2 temperature probes. Thus the maximum preset temperature difference between 2 points can never be exceeded. This achieves even and uniform heating and prevents material stress.



The MF 3.0 has a 7" touchscreen



Optional signal tower for MF 2.5 and 3.0

# INDUCTION HEATERS

## Fixed inductors

This type is generally used for workpieces of the same design that are frequently encountered and have to be heated. It is also frequently used for relatively small workpieces where a flexible inductor cannot be deployed. The versions can vary from an inductor that heats the workpiece from inside a bore to a variant that heats the workpiece from the outside.

Fixed inductors are tailor-made and designed in principle for 1 type of workpiece. If the dimensions of several workpieces are very similar, it is sometimes possible to use 1 inductor for several workpieces. Fixed inductors are generally equipped with inductor recognition and overheating protection.

### Standard size fixed inductors

For specific applications in the rail industry, we have standard fixed inductors in our range. These fit the job perfectly and can be used in repetitive production.

### SMART inductor recognition

The desired temperature and desired power do not have to be set if an inductor with identification feature is connected. In this case the generator automatically adopts the settings defined in the program (1, 2 or 3) for the corresponding inductor.



**Fixed inductor**



**Labyrinth inductor**



**Sandwich table inductor**



**Pin inductor**



**Fixed inductor**



**Table inductor**



**Connection set**



**Heating bearing rings for dismantling**



**Heating labyrinth rings for dismantling**

Standard railway inductor type	Art. no.	Boring Ø mm	Width mm	Max. power kW	Max. temperature
Fixed inductor labyrinth	350200900	202	90	22	180 °C / 356 °F
Fixed inductor innering	350200902	171	150	22	150 °C / 302 °F
Fixed inductor labyrinth	350200903	177	90	22	180 °C / 356 °F

Other sizes can be ordered as tailor-made products.

# INDUCTION HEATERS

## Flexible inductors

Flexible inductors can be placed in or around a workpiece. Therefore, they are ideal for a large variety of parts. From large inner rings to very large components such as gear wheels and housings.

- A variation of different cable lengths, temperature- and power levels are available. Thanks to their flexibility, a wide range of applications is possible.
- Used to wrap a number of windings around, inside (bore) or on a workpiece (as a flat coil on a surface).
- Flexible inductors are meant to be used with BETEX Middle frequent generators. Make sure the capacity of the inductor corresponds with the capacity of the generator.

### Caged flexible inductors

In this case, a flexible inductor is wrapped in a cage. This provides a lightweight construction that allows serial heating of a repetitive size. Often this solution is a lighter alternative to a comparable fixed inductor.



**Magnetic holder**

Optional: magnetic holders to secure the flexible inductors.



**Heating a bore for bearing or shaft mounting**



**Heating a coupling for dismounting**



**Flexible inductor 180°C**



**Flexible inductor 300°C**



**Caged flexible inductor**



**Connection set**

Type	Length m	Max. temperature	Diameter cable Ø mm	Min. winding diameter mm
3.5 kW	5, 7.5, 10	180 °C / 356 °F	12	approx. 90
10 kW*	15, 20, 25, 30	180 °C / 356 °F	12	approx. 75
10 kW	15, 20, 25, 30, 35	180 °C / 356 °F	15	approx. 100
10 kW	15, 20, 25, 30	300 °C / 572 °F	20	approx. 120
22 kW*	15, 20, 25, 30	180 °C / 356 °F	12	approx. 75
22 kW	15, 20, 25, 30, 35	180 °C / 356 °F	15	approx. 100
22 kW	15, 20, 25, 30	300 °C / 572 °F	20	approx. 120
44 kW	15, 20, 25, 30, 35	180 °C / 356 °F	19	approx. 140
44 kW	15, 20, 25, 30	300 °C / 572 °F	28	approx. 220

\*Short usage

# TECHNICAL SPECIFICATIONS

## Middle-frequency 2.5



Type	MF Quick-Heater 2.5 10kW	MF Quick-Heater 2.5 22kW	MF Quick-Heater 2.5 44kW
Forced air cooling	Yes	Yes	Yes
Power	10kW	22kW	44kW
Frequency range	10-25 kHz	10-25 kHz	10-25 kHz
Voltage/Amperage	3 ~ 400V/16A 3 ~ 450V/14A 3 ~ 500V/12A 3 ~ 600V/10A	3 ~ 400V/32A 3 ~ 450V/30A 3 ~ 500V/28A 3 ~ 600V/23A	3 ~ 400V/63A 3 ~ 450V/59A 3 ~ 500V/55A 3 ~ 600V/45A
Frequency	50/60Hz	50/60Hz	50/60Hz
Temperature measurement	For type K thermocouple	For type K thermocouple	For type K thermocouple
Max. temperature °C / °F	300 °C / 572 °F	300 °C / 572 °F	300 °C / 572 °F
Accuracy	± 3.5°C / ± 6.3 °F	± 3.5°C / ± 6.3 °F	± 3.5°C / ± 6.3 °F
Inductor recognition	Yes	Yes	Yes
Temperature sensor (2 pieces)	Yes, for max 300°C / 572 °F	Yes, for max 300°C / 572 °F	Yes, for max 300°C / 572 °F
Extra thermocouple input	Yes	Yes	Yes
Dimensions of generator LxWxH	600x300x600 mm / 23.6x11.8x23.6 inch	600x300x600 mm / 23.6x11.8x23.6 inch	600x650x580 mm / 23.6x25.6x22.8 inch
Weight of generator	46 kg	46 kg	78 kg
<b>Operation</b>			
Dimensions display	3.5"	3.5"	3.5"
Heat curve in display	No	No	No
Delta T (ΔT)	Yes	Yes	Yes
Setpoint power	Via touchscreen	Via touchscreen	Via touchscreen
Setpoint temperature	Via touchscreen	Via touchscreen	Via touchscreen
Setpoint temperature curve	No	No	No
Setpoint timer	Via touchscreen	Via touchscreen	Via touchscreen
Selection operating mode	Via touchscreen	Via touchscreen	Via touchscreen
Digital readings temperature	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen
Digital readings time	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen
Digital readings power	Actual value on touchscreen	Actual value on touchscreen	Actual value on touchscreen
Digital readings frequency	Actual value on touchscreen	Actual value on touchscreen	Actual value on touchscreen
USB connection	No	No	No
Network connection	No	No	No
Heating log	No	No	No
<b>Signaling by</b>			
Installation in operational state	Green flash light	Green flash light	Green flash light
Error message	Red continuous light / acoustic signal	Red continuous light / acoustic signal	Red continuous light / acoustic signal
End of heating cycle	Green continuous light / acoustic signal	Green continuous light / acoustic signal	Green continuous light / acoustic signal
Signal tower	Optional	Optional	Optional

We reserve the right to alter technical specifications without prior notice.



# TECHNICAL SPECIFICATIONS

## Middle-frequency 3.0



Type	MF Quick-Heater 3.0 3.5kW	MF Quick-Heater 3.0 10kW	MF Quick-Heater 3.0 22kW	MF Quick-Heater 3.0 44kW
Forced air cooling	Yes	Yes	Yes	Yes
Power	3,0kW* / 3,5kW**	10kW	22kW	44kW
Frequency range	10-50kHz	10-25 kHz	10-25 kHz	10-25 kHz
Voltage/Amperage	230V / 13A* 230V / 16A**	3 ~ 400V / 16A 3 ~ 450V / 14A 3 ~ 500V / 12A 3 ~ 600V / 10A	3 ~ 400V / 32A 3 ~ 450V / 30A 3 ~ 500V / 28A 3 ~ 600V / 23A	3 ~ 400V / 63A 3 ~ 450V / 59A 3 ~ 500V / 55A 3 ~ 600V / 45A
Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Temperature measurement	For type K thermo element	For type K thermocouple	For type K thermocouple	For type K thermocouple
Max. temperature °C / °F	240 °C / 464 °F	300 °C / 572 °F	300 °C / 572 °F	300 °C / 572 °F
Accuracy	± 3.5°C / ± 6.3 °F	± 3.5°C / ± 6.3 °F	± 3.5°C / ± 6.3 °F	± 3.5°C / ± 6.3 °F
Inductor recognition	No	Yes	Yes	Yes
Temperature sensor (2 pieces)	Yes, for max 300°C / 572 °F	Yes, for max 300°C / 572 °F	Yes, for max 300°C / 572 °F	Yes, for max 300°C / 572 °F
Extra thermocouple input	Yes	Yes	Yes	Yes
Dimensions of generator LxWxH	320 x 350 x 150 mm / 12.6x13.8x5.9 inch	600x300x600 mm / 23.6x11.8x23.6 inch	600x300x600 mm / 23.6x11.8x23.6 inch	600x650x580 mm / 23.6x25.6x22.8 inch
Weight of generator	7,85 kg	46 kg	46 kg	78 kg
<b>Operation</b>				
Dimensions display	4,3"	7"	7"	7"
Heat curve in display	Yes	Yes	Yes	Yes
Delta T (ΔT)	Yes	Yes	Yes	Yes
Setpoint power	No	Via touchscreen	Via touchscreen	Via touchscreen
Setpoint temperature	Via touchscreen	Via touchscreen	Via touchscreen	Via touchscreen
Setpoint temperature curve	Via touchscreen	Via touchscreen	Via touchscreen	Via touchscreen
Setpoint timer	Via touchscreen	Via touchscreen	Via touchscreen	Via touchscreen
Selection operating mode	Via touchscreen	Via touchscreen	Via touchscreen	Via touchscreen
Digital readings temperature	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen
Digital readings time	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen	Setpoint and actual value on touchscreen
Digital readings power	No	Actual value on touchscreen	Actual value on touchscreen	Actual value on touchscreen
Digital readings frequency	No	Actual value on touchscreen	Actual value on touchscreen	Actual value on touchscreen
USB connection	Yes	Yes	Yes	Yes
Network connection	No	Yes	Yes	Yes
Heating log	Yes	Yes	Yes	Yes
<b>Signaling by</b>				
Installation in operational state	LED on front	Via touchscreen	Via touchscreen	Via touchscreen
Error message	Acoustic signal	Acoustic signal	Acoustic signal	Acoustic signal
End of heating cycle	Acoustic signal	Acoustic signal	Acoustic signal	Acoustic signal
Signal tower	-	Optional	Optional	Optional

\*UKCA model specifications.

\*\* CE model specifications.