/// Plug-in timer relay, delay-off with 2x 2 C/O contacts

Rugged plug-in relays for extreme reliability, within long endurance applications and harsh environments

WDDE
Timer relay, one shot
Part of D-platform

Features

- One-shot time delay and instantaneous relay
- Compact plug-in design
- 2 C/O one-shot contacts and 2 C/O instantaneous contacts
- Pulse time adjustable with a lockable knob
- Pulse times between 0.1 s...60 min
- Also available with fixed pulse time (no knob)
- Suitable for DC and AC input
- Two LEDs for status indication
- Flat, square and silver plated relay pins for excellent socket connection
- Integrated snap lock
- Optional positive mechanical keying relay to socket

Description

Plug-in industrial electronic timer relay with two instantaneous change-over contacts and two one-shot change-over contacts. When the relay is activated the one-shot change-over contacts are activated with one pulse. The pulse time is adjustable with a lockable knob. The relay can also be supplied with a fixed pulse time (no knob). The relay is equipped with two LEDs to indicate presence of power supply and energizing of the coil.

The construction of the relay and choice of materials make the WDDE relay suitable to withstand low and high temperatures, shock & vibrating and dry to humid environments.

No external retaining clip needed as integrated 'snap-lock' will hold relay into socket under all circumstances and mounting directions.

Compact design, choice of many options and a wide range of sockets make the WDDE relay an easy and flexible solution to use.
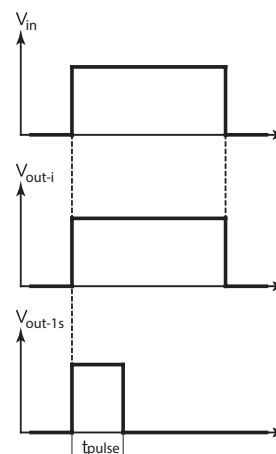
Application

These relays are designed for demanding power utility applications. The WDDE is used in applications where instantaneous contacts and contacts with one pulse in output are necessary.

Connection diagram
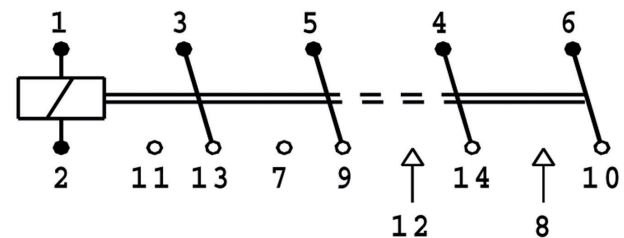
Timing diagrams

Compliancy

IEC 61812-1
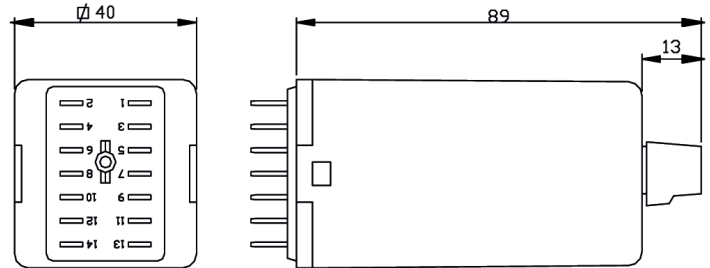IEC 60947
IEC 60947-5-1
IEC 60255
EMC Directive

$C\mkern-2mu\epsilon$

Options

- Low temperature (-40 $^{\circ}$C)
- Double zener diode

Dimensions (mm)

Sockets

		Mounting			
		Surface / Wall	35 mm rail	Panel / Flush	PCB
Terminal connection	Screw	V23	V23	-	-
	Screw - wide terminals	V22 BR	V23 BR	-	-
	Spring clamp	V29	V29	V33	-
	Faston	-	-	V31	-
	Crimp	-	-	V26	-
	Solder tag	-	-	V3	-
	PCB	-	-	-	V32

For more information see the respective datasheets

For more detailed technical specifications, drawings and ordering information, go to the product page on www.morssmitt.com

🌐 Over 10 million Mors Smitt relays in use in applications worldwide!

Mors Smitt Asia Ltd.
26/F., Casey Aberdeen House
38 Heung Yip Road, Wong Chuk Hang
Hong Kong
Tel: +852 2343 555
sales.msa@wabtec.com

Wabtec Netherlands B.V.
Darwinstraat 10
6718 XR Ede, Netherlands
Tel: +31 (0)88 600 4500
wnl_salessupport@wabtec.com

Mors Smitt France SAS
2 Rue de la Mandinière
72300 Sablé-sur-Sarthe, France
Tel: +33 (0) 243 92 82 00
sales.msf@wabtec.com

Mors Smitt Technologies Ltd.
1010 Johnson Drive
Buffalo Grove, IL 60089-6918, USA
salesmst@wabtec.com

Mors Smitt UK
Graycar Business Park
Burton on Trent, DE13 8EN, UK
Tel: +44 (0)1283 357 263
sales.msuk@wabtec.com

RMS Mors Smitt
19 Southern Court
Keysborough, VIC 3173, Australia
Tel: +61 (0)3 8544 1200
sales.rms@wabtec.com

Technical specifications

Time delay characteristics

Time delay function		One shot and instantaneous
Available time ranges	Adjustable	0.1s...60 min
Accuracy	Adjustment	< 10 % of full scale After adjusting / fixed time setting: no variation in setpoint
	Repeatability	± 0.5 %
Time variation	vs. voltage variations	± 0.05 % / % U_{nom}
	vs. temperature variation	± 0.02 % / K
Recovery time		± 0.1 s
Pull-in time		< 15 ms
Release time		< 15 ms
Example pulse time: Pulse time set on 2 s : it will be between 1.8 s...2.2 s. For example: 2.0 s. The ambient temperature is 40 °C which is 20 degrees different compared to the standard 20 °C. This results in 0.4 % pulse time variation. The applied voltage is 20 % lower than the nominal voltage. This results in 1.0 % extra time variation. The total time variation is then 0.5 % (repeatability) + 0.4 % (temperature variation) + 1.0 % (voltage variation) = 1.9 %. In this case the pulse time will be between 1.96 s and 2.04 s.		

Coil characteristics

Operating voltage range		0.8...1.1 U_{nom}
Nominal power consumption	During pulse	< 1.1 W/VA (24 V) < 1.5 W/VA (110 V) < 2.7 W/VA (220 V) Lower voltage = lower power
	After pulse	< 0.6 W/VA (24 V) < 1.0 W/VA (110 V) < 1.7 W/VA (220 V) Lower voltage = lower power

Type	U_{nom} (VAC/DC)	U_{min} (VAC/DC)	U_{max} (VAC/DC)	$U_{dropout}$ (VAC/DC)
WDDE-024	24	19.2	26.4	2.4
WDDE-048	48	38.4	52.8	4.8
WDDE-060	60	48.0	66.0	6.0
WDDE-110	110	88.0	121.0	11.0
WDDE-220	220	176.0	242.0	22.0

Other types on request
Remarks:
• Umin is the must-operate voltage at which the relay has picked up in all circumstances (worst-case situation), in practice the relay picks up at a lower voltage
• Udrop-out is the must-release voltage at which the relay has dropped-out in all circumstances (worst case situation), in practice the relay drops out at a higher voltage
• To reset the time function, the voltage must drop below Urelease
• Always select the nominal voltage as close as possible to the actual voltage in the application

Contact characteristics

Amount and type of contacts	2 C/O one-shot and 2 C/O instantaneous
Maximum make current	14 A
Maximum continuous current	8 A (AC1; IEC 60947)
Maximum switching voltage	250 VDC, 250 VAC
Minimum switching voltage	12 V
Minimum switching current	100 mA
Maximum switching capacity and contact life	see graph page 6
Material	AgNi

Electrical characteristics

Dielectric strength	Pole-pole	2.5 kV, 50 Hz, 1 min
	Cont-coil	2.5 kV, 50 Hz, 1 min
	Open contacts	1.0 kV; 50 Hz; 1 min

Mechanical characteristics

Mechanical life	10×10^6 operations
Maximum switching frequency	Mechanical: 3600 ops/h Electrical: 1200 ops/h
Torque value screw to lock knob	0.2-0.4 Nm
Weight	112 g (without options)

Environmental characteristics

Environmental	IEC 61810
Vibration	IEC 61373, Category I, Class B, Body mounted
Shock	IEC 61373, Category I, Class B, Body mounted
Operating temperature	-25 °C...+70 °C (with option C -40 °C)
Humidity	93%
Salt mist	IEC 60068-2-11, NaCi, 35 °C for 4 days
Damp heat	IEC 60068-2-30, Test method Db variant 1
Protection	IEC 60529, IP40 (relay on socket) (with option K: IP50)
Insulation materials	Cover: polycarbonate Base: polyester

Industry compliancy

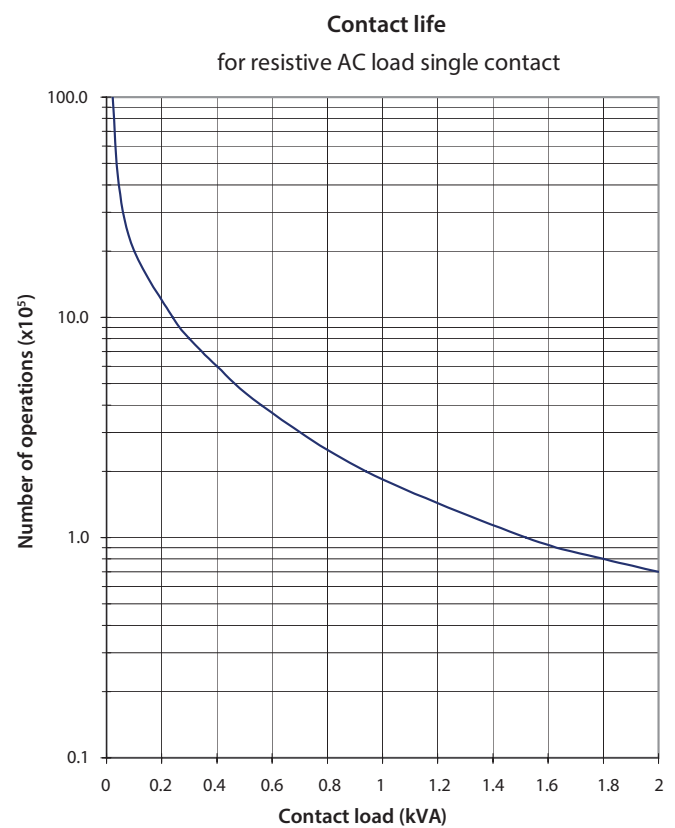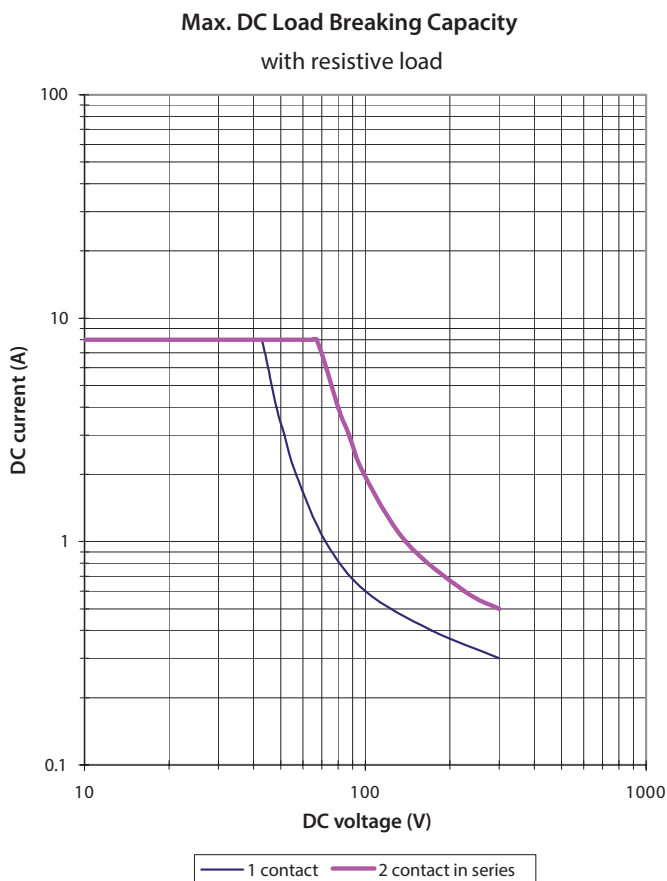| IEC 61810	Electromechanical elementary relays
IEC 60947	Low voltage switch gear and control gear
IEC 60947-5-1	Electromechanical control circuit devices and switching elements
IEC 60255	Relay design and environmental conditions
CE	

Options

Code	Description	Remark	Cannot be combined with:
Standard options:			
C	Low temperature (-40 ºC)	Max contact current 8A	
Q	Double zener diode. Coil protection against transient voltage.	DC coil only. Max. allowed peak voltage: 180 V. Higher voltage will damage the diode. Replaces back EMF diode	

Electrical life expectancy and breaking capacity

The life expectancy values shown below are based on factory tests (test frequency at 1/3 Hz). These values could be different in real life applications as environmental conditions, switching frequencies and duty cycles will influence these values. Putting more contacts in series (Y) will increase breaking capacity and life expectancy significantly.

Max. DC Load Breaking Capacity
with resistive load

- 1 contact
- 2 contact in series

Contact life
for resistive AC load single contact

Mounting possibilities/sockets

V3	V22BR	V23	V23BR	V26
V29	V31	V32	V33	

Surface/wall mounting

338000302	V22BR	Screw socket, wall mount, front connection (9 mm terminals)
338000580	V23	Screw socket, wall mount, front connection (7.5 mm terminals)
338000610	V29	Spring clamp socket, wall mount, front dual connection (2.5 mm^2)

Rail mounting

338000580	V23	Screw socket, rail mount, front connection (7.5 mm terminals)
338000402	V23BR	Screw socket, rail mount, front connection (9 mm terminals)
338000610	V29	Spring clamp socket, rail mount, front dual connection (2.5 mm^2)

Panel/flush mounting

|		
338100100	V3	Solder tag socket, panel mount, rear connection
328400100	V26	Crimp contact socket, panel mount, rear connection, A260 crimp contact
338000560	V31	Faston connection socket, rear dual connection (4.8 x 0.8 mm)
338000670	V33	Spring clamp socket, flush mount, rear dual connection (2.5 mm^2)

PCB mounting

338000561	V32	PCB soldering socket

No external retaining clip needed as the 'snap-lock' will hold the relay into the socket under all circumstances and mounting directions (according shock & vibration requirements IEC 61373, Category I, Class B, Body mounted). If regulations require external retaining clips, these are available as well.

For more details see datasheets of the sockets on www.morssmitt.com

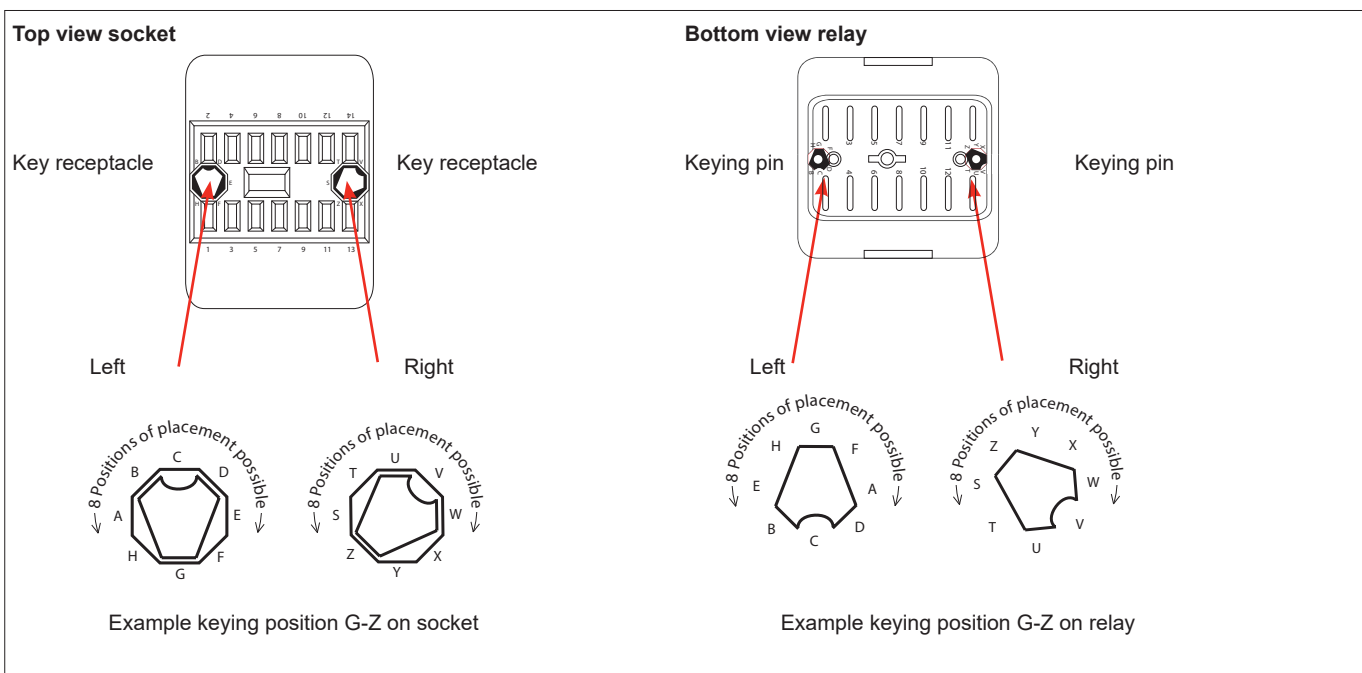## Mechanical keying relay and socket (optional)
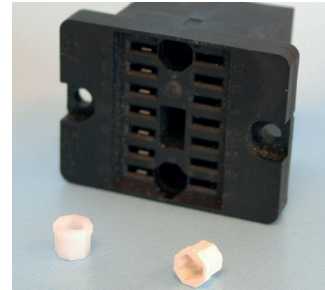
Function:
• To prevent wrong installation
• To prevent damage to equipment
• To prevent unsafe situations

Using keyed relays and sockets prevents a relay is inserted in a wrong socket. For example it prevents that a 24 VDC relay is put in a 110 VDC circuit. Positive discrimination is possible per different function, coil voltage, timing, monitoring, safety and non-safety.

The D relay socket keying option gives 8 x 8 = 64 possibilities. Upon ordering the customer simply indicates the need for the optional keying. Mors Smitt will assign a code to the relay and fix the pins into the relay. The sockets are supplied with loose key receptacles. Inserting the keys into the socket is very simple and self explaining.

Remark: Sockets and relay shown are examples.

Top view socket

Key receptacle   Key receptacle

Left   Right

8 Positions of placement possible

Example keying position G-Z on socket

Bottom view relay

Keying pin   Keying pin

Left   Right

8 Positions of placement possible

Example keying position G-Z on relay

Keying codes

	Coil voltage code	
	24-60	72-230
Silver contacts (standard)	AS	AU
Gold contacts (option E)	DT	AZ
Silver tin oxide (option M)	GT	GV

Important for relay selection and operation

Make sure the relay is suitable for the application. For critical applications (for example: green loop applications) relays should be checked on correct working during periodic inspection.

Recommendations for long time contact reliability

For relays to enable failure free performance over a very long operational time, it is important to create the right circumstances. In any relay, contact usage and atmospheric conditions influence the contact surface. To counter this effect it is common practice to use a safety factor of > 2 to ensure long time contact reliability.

Therefore for long time contact reliability we recommend:
- Silver contacts: a minimum contact current of 20 mA per contact
- Gold contacts: a minimum contact current of 10 mA per contact
- Double Make Double Break contacts: a minimum contact current of 40 mA per contact
- When low currents are switched and not frequently, e.g. 10 mA once a day, it is advised next to gold plated contacts to put similar contacts within the same relay in parallel
- With higher load switching, e.g. 110 VDC and > 1 A, put relay contacts in series
- Rule of thumb: any relay works best with switching currents > 20 mA in DC environment when frequently switched. When not switched frequently a higher switching current like 50 mA is better for a long reliable operational time
- Check relays regularly, for example with the Mors Smitt Portable Relay Tester and visually through the transparent cover

Instructions for use

Installation

Before installation or working on the relay: disconnect the power supply first (no hot swapping)! Install socket and connect wiring according to the terminal identification. Plug relay into the socket ensuring there is no gap between the bottom of relay and the socket. Reverse installation into the socket is not possible due to the mechanical blocking snap-lock feature. Check to ensure that the coil connection polarity is not reversed. Relays can be mounted tightly together to save space. When rail mounting is used, always mount the socket in the direction of the UP arrow, to have proper fixation of the socket on the rail. Torque value screw to lock knob: 0.2-0.4 Nm

Warning!
- Never use silicon in the proximity of the relays
- Do not use the relay in the presense of flammable gas as the arc generated from switching could cause ignition
- To remove relays from the socket, employ up and down lever movements. Sideway movement may cause damage to the coil wires
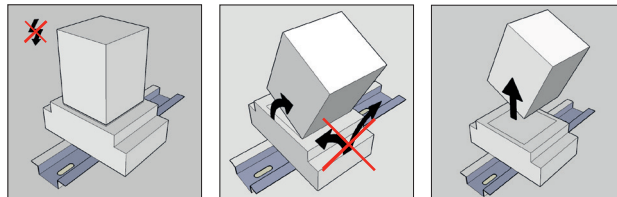
- Relays should never be swapped to other circuit positions when taken out of its socket for inspection or fault finding, always place it back into the original position to prevent contact resistance problems. Contact resistance problems can be created when swapping relays between different circuit loads due the contact wear/condition having changed during its operational life.

Operation

After installation always apply the rated voltage to the coil to check correct operation. Long term storage may corrode the silver on the relay pins. When plugging the relay into the socket, the female bifurcated or trifurcated receivers will automatically cut through the corrosion on the pins and guarantee a reliable connection.

Before actual use of relays, it is advised to switch the load several times with the contacts. The contacts will both be electrically and mechanically cleaned due to the positive wiping action. Sometimes a contact can build up increased contact resistance ($\leq$ 15 mΩ when new). When using silver contacts one can clean the contact by switching a contact load a few times using >24 VDC & ~ 2A. Increased contact resistance is not always problematic, as it depends on circuit conditions. In general a contact resistance of 1 Ω is no problem, consult Mors Smitt for more information.

Condensation in the relay is possible when the coil is energised (warm) and the outside, environmental temperature is cold. This is a normal phenomenon and will not affect the function of the relay. Materials in the relay have no hygroscopic properties.

Inspection / maintenance

Correct operation of the relay can easily be checked as the transparent cover provides good visibility of the moving contacts. If the relay does not seem to operate correctly, check for presence of the appropriate coil voltage and polarity using a suitable multimeter. If a LED is fitted, it indicates voltage presence to the coil. If coil voltage is present, but the relay does not operate, a short circuit of the suppression diode is possible (This may have been reversed due to the coil connection).

Relays can easily be tested with the Mors Smitt Relay Tester. More information on: www.morssmitt.com.

If the relay doesn't work after inspection, replace the relay unit with a similar model. Do not attempt to open the relay cover or try to repair. Contacts are calibrated and in balance, touching can affect proper operation. Also resoldering may affect correct operation. Since 2009 relays have tamper proof seals fitted and once broken, warranty is void.

Most relay defects are caused by installation faults such as overvoltage, spikes/transients, high/short current far exceeding the relay specifications. When returning the relays for investigation, please provide all information on the RMA form. Send defective relays back to the manufacturer for repair or replacement. Normal wear and tear or external causes are excluded from warranty.

RMA procedure see www.morssmitt.com

Ordering scheme

WDDE-							Cannot be combined with

Coil voltages				
	24 VAC/DC			
	48 VAC/DC			
	60 VAC/DC			
	110 VAC/DC			
	220 VAC/DC			

Options			
(add as many options as needed)	**C**		Low temperature (-40 °C) - Max contact current 8 A
	Q		Double zener diode

Time ranges		
	0.1-1 s	
	0.3-3 s	
	0.6-6 s	
	1-10 s	
	3-30 s	
	6-60 s	
	0.3-3 min	
	0.6-6 min	
	1-10 min	
	3-30 min	
	6-60 min	
	Fixed	Value between 0-180 s, no knob

Example: WDDE-24 VAC/DC - C 3 s
Description: WDDE-relay, Unom: 24 VAC/DC, low temperature, pulse time 3 s

🌍 Over 10 million Mors Smitt relays in use in applications worldwide!

Mors Smitt Asia Ltd.
26/F., Casey Aberdeen House
38 Heung Yip Road, Wong Chuk Hang
Hong Kong
Tel: +852 2343 555
sales.msa@wabtec.com

Mors Smitt France SAS
2 Rue de la Mandinière
72300 Sablé-sur-Sarthe, France
Tel: +33 (0) 243 92 82 00
sales.msf@wabtec.com

Mors Smitt UK
Graycar Business Park
Burton on Trent, DE13 8EN, UK
Tel: +44 (0)1283 357 263
sales.msuk@wabtec.com

Wabtec Netherlands B.V.
Darwinstraat 10
6718 XR Ede, Netherlands
Tel: +31 (0)88 600 4500
wnl_salessupport@wabtec.com

Mors Smitt Technologies Ltd.
1010 Johnson Drive
Buffalo Grove, IL 60089-6918, USA
salesmst@wabtec.com

RMS Mors Smitt
19 Southern Court
Keysborough, VIC 3173, Australia
Tel: +61 (0)3 8544 1200
sales.rms@wabtec.com