

/// Plug-in industrial relay with 4 C/O contacts

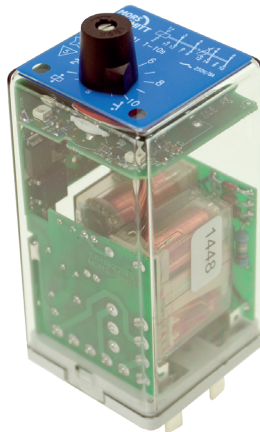
Rugged plug-in relays for extreme reliability, within long endurance

This relay is obsolete from January 1, 2023

TDDB

Timer relay

Part of D-platform



Description

Plug-in industrial electronic timer relay with two instantaneous change-over contacts and two time delayed change-over contacts. When the relay is activated there is a delay on pull-in for the time delayed contacts. The delay time is adjustable with a lockable knob. The relay can also be supplied with a fixed time delay (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 TDDB 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 TDDB relay an easy and flexible solution to use.

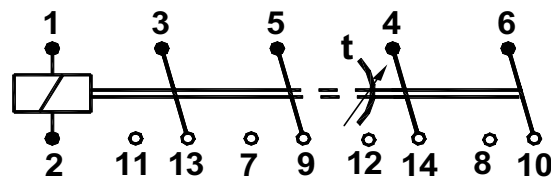
Application

These relays are designed for demanding power utility applications. The TDDB is used in applications where instantaneous contacts and contacts with a time delay in output are necessary.

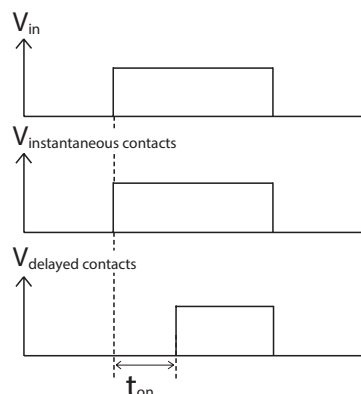
Features

- Time delay and instantaneous relay
- Compact plug-in design
- 2 C/O contacts with delay on pull-in and 2 C/O instantaneous contacts
- Delay time adjustable with a lockable knob
- Also available with fixed time delay (no knob)
- Suitable for DC and AC input (50/60 Hz)
- 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

Connection diagram



Timing diagram



Compliance

IEC 61810
IEC 60947
IEC 60947-5
IEC 60255



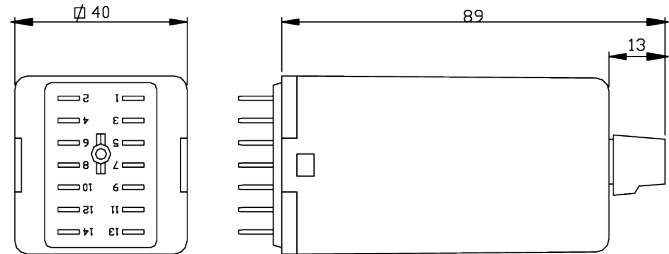
Timer relay TDDB

Options

- Low temperature (-40 °C), max. contact current 8 A
- Extra dust protection
- Double zener diode

Remark: Not all combinations possible

Dimensions (mm)



Solve-All relay application concept

The unique D relay with all its options has been designed in close cooperation with customers from the power utility industry.

The Solve-All relay application concept offers ultimate flexibility to design and supply tailor made D relays.

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.
 Unit B & C, 25/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.msfr@wabtec.com

Mors Smitt UK Ltd.
 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
sales.msbn@wabtec.com

Mors Smitt Technologies Ltd.
 1010 Johnson Drive,
 Buffalo Grove, IL 60089-6918, USA
 Tel: +1 847 777 6497
salesmst@wabtec.com

RMS Mors Smitt
 6 Anzed Court,
 Mulgrave, VIC 3170, Australia
 Tel: +61 (0)3 8544 1200
sales.rms@wabtec.com

(c) Copyright 2019

All rights reserved. Nothing from this edition may be multiplied, or made public in any form or manner, either electronically, mechanically, by photocopying, recording, or in any manner, without prior written consent from Mors Smitt. This also applies to accompanying drawings and diagrams. Due to a policy of continuous development Mors Smitt reserves the right to alter the equipment specification and description outlined in this datasheet without prior notice and no part of this publication shall be deemed to be part of any contract for the equipment unless specifically referred to as an inclusion within such contract. Mors Smitt does not warrant that any of the information contained herein is complete, accurate, free from potential errors, or fit for any particular purpose. Mors Smitt does not accept any responsibility arising from any party's use of the information in this document.

Technical specifications

Time delay characteristics

Time delay function Available time ranges, adjustable (xx)	Delay on pull-in and instantaneous		
	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	
	Other ranges on request		
Accuracy	adjustment	<10 % of full scale	
	repeatability	After adjusting / fixed time setting: no variation in setpoint < 0.5 %	
Time variation	vs voltage variation	± 0.05% / % U _{nom}	
	vs. temperature variation	± 0.02 % / K	
Recovery time		± 0.1 s	
Pull-in time	Delayed contacts	Depending on pull-in time setting (xx)	
Release time		< 15 ms	
<p>Example time delay : Time range 0.3...3 s Time delay set on 2 s : delay will be between 1.7 s...2.3 s.</p> <p>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 % extra time variation. The applied voltage is 20 % lower than the nominal voltage. This results in 1.0 % extra time variation. The total maximum time variation is then 0.5 % (repeatability) + 0.4 % (temperature variation) + 1.0 % (voltage variation) = 1.9 %. In this case every new time delay will be between 1.96 s and 2.04 s.</p>			

Coil characteristics

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

Type	U _{nom} (VAC/VDC)	U _{min} (VAC/VDC)	U _{max} (VAC/VDC)	U _{drop-out} (VAC/VDC)
TDDB-24	24	19.2	26.4	2.4
TDDB-48	48	38.4	52.8	4.8
TDDB-60	60	48.0	66.0	6.0
TDDB-110	110	88.0	121.0	11.0
TDDB-220	220	176.0	242.0	22.0

Other types on request

Remarks:

- U_{min} 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
- U_{drop-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 (U_{release})
- To reset the time function, the voltage must drop below U_{drop-out}
- AC, voltage 50/60
- Always select the nominal voltage as close as possible to the actual voltage in the application

Timer relay TDDB

Contact characteristics

Maximum make current		14 A
Maximum continuous current	IEC 60947	8 A
Maximum switching voltage		300 VDC, 250 VAC
Minimum switching voltage		12 V
Minimum switching current		100 mA
Material		AgNi + 0.15 µm Au

Electrical characteristics

Dielectric strength	IEC 60255-5	Pole-pole	2.5 kV, 50 Hz, 1 min
	IEC 60077	Cont-coil	2.5 kV, 50 Hz, 1 min
		Open contacts	1 kV; 50 Hz; 1 min

Mechanical characteristics

Mechanical life	20 x 10 ⁶ operations
Maximum switching frequency	Mechanical: 3600 ops/h Electrical: 1200 ops/h
Maximum torque value screw to lock knob	0.15 Nm
Weight	112 g (without options)

Environmental characteristics

Environmental	EN 50125-1 and IEC 60077-1
Vibration	IEC 61373, Category I, Class B, Body mounted
Shock	IEC 61373, Category I, Class B, Body mounted
Operating temperature	-25 °C...+70 °C (optional: -40 °C)
Humidity	93%
Maximum altitude	2000 meter. Higher altitudes are possible but have consequences mentioned in IEC 60664 (for example 5000 meter with bigger clearance distance)
Salt mist	IEC 60068-2-11, class ST4
Damp heat	IEC 60068-2-30, Test method Db variant 1
Protection	IEC 60529, IP40 (relay on socket)
Insulation materials	Cover: polycarbonate Base: polyester

Industry compliancy

IEC 61812-1	Time relays for industrial and residential use
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	

Timer relay TDDB

Options

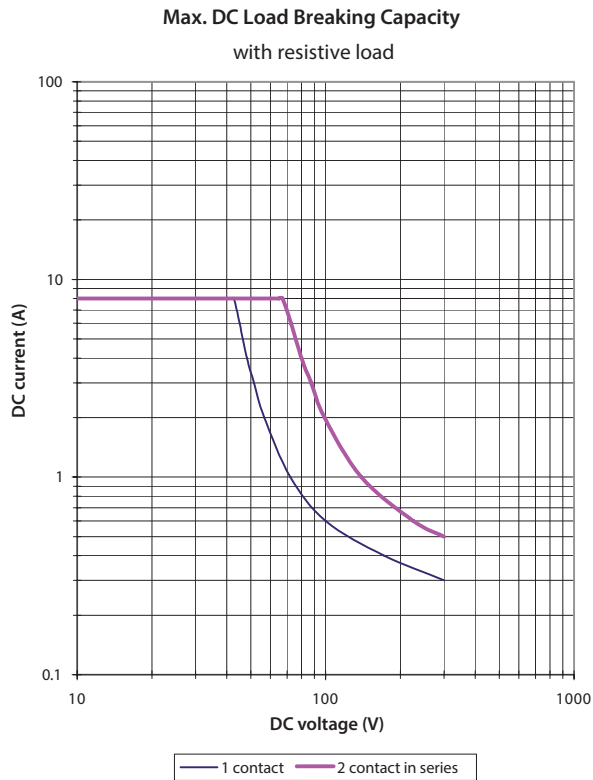
Code	Description	Remark	Cannot be combined with:
Standard options:			
C	Low temperature (-40 °C)	Icontact < 8 A	
K	Extra dust protection	IP50 Cat 2 for the relays mounted in a Mors Smitt socket. Application PD1/PD2 and contact load > 0.5 A.	
Q	Double zener diode over coil	Maximum allowed peak voltage 180 V, higher voltage will damage the diode	

Remark: For application support or technical product support, contact your local Mors Smitt sales office (see contact details on last page).

Timer relay TDDB

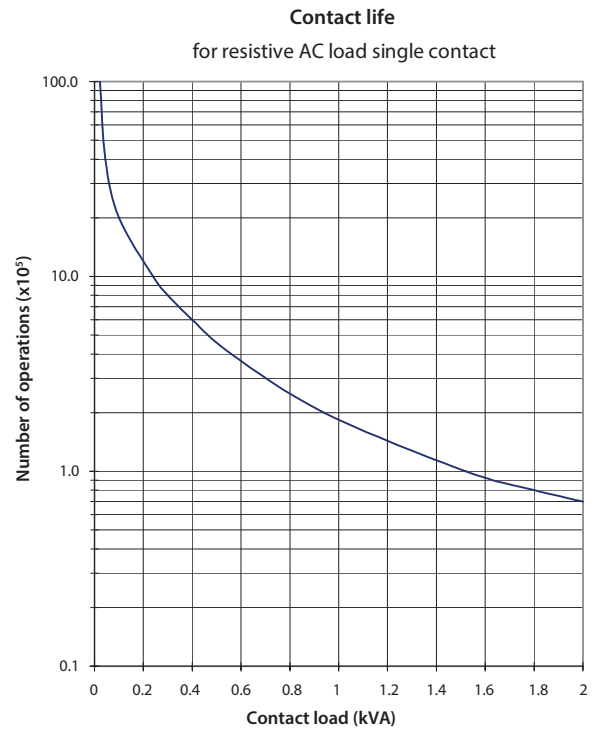
Maximum breaking capacity

Max. DC load breaking capacity with resistive load



Contact life

Contact life for resistive AC load single contact



Timer relay TDDB

Mounting possibilities/sockets



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)
338000570	V33	Spring clamp socket, flush mount, rear dual connection (2.5 mm ²)

PCB mounting

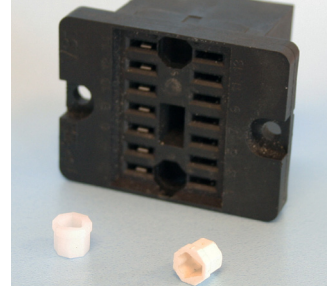
338000561	V32	PCB soldering socket
-----------	-----	----------------------

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

Timer relay TDDB

Mechanical keying relay and socket (optional)



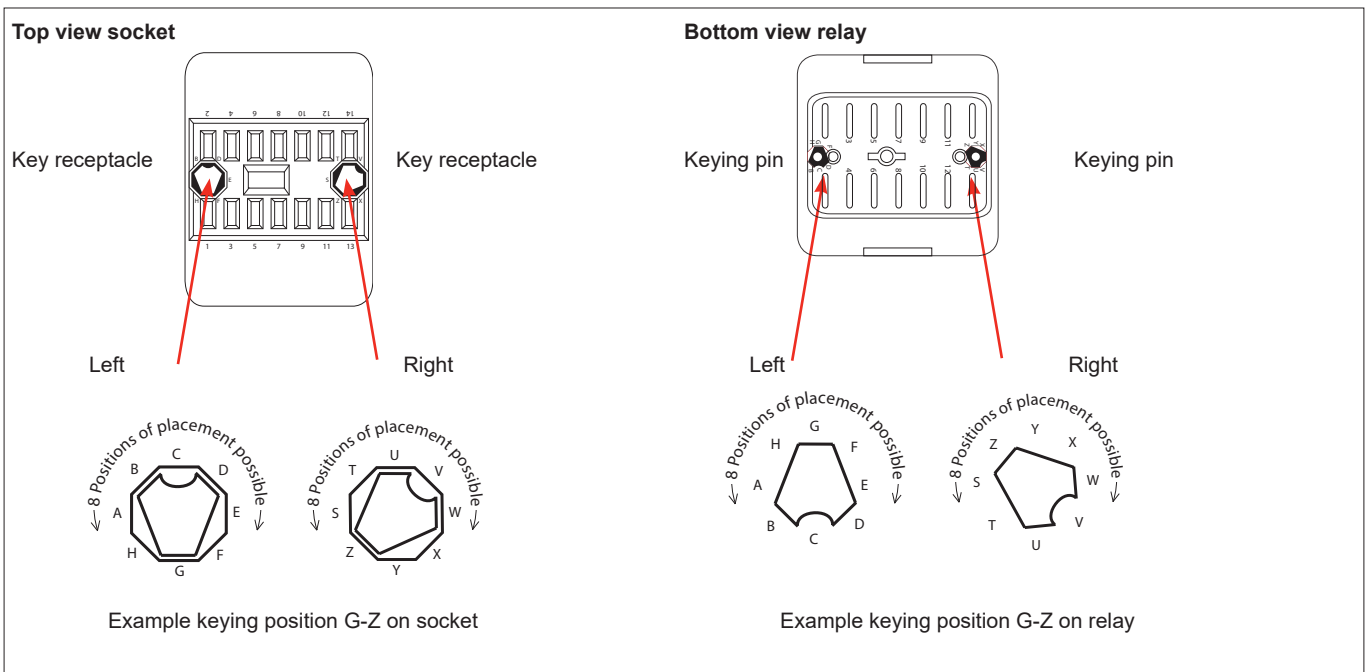
Function:

- 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 $8 \times 8 = 64$ 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.



Timer relay TDDB

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

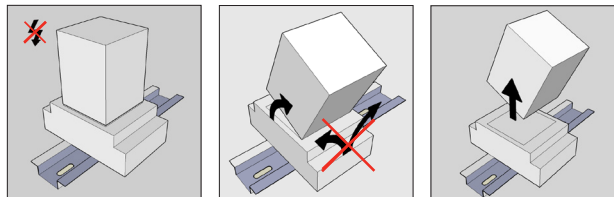
Instructions for use

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.

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 (≤ 15 m Ω when new). When using silver contacts one can clean the contact by switching a contact load a few times using >24 VDC & ~ 2 A. 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.

Timer relay TDDB

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

Timer relay
TDDB
Ordering scheme

TDDB -		<input type="text"/>	-	<input type="text"/>	<input type="text"/>	
Coil voltages VAC/VDC	24					
	48					
	60					
	210					
	220					
Options (add as many options as needed)	C				Low temperature (-40 °C) - Max contact current 8 A	
	K				Extra dust protection, IP50	
	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				
Upon ordering indicate keying if necessar.		Fixed			No knob	

Example: TDDB-24 VAC/DC - C 1...10 s

Description: TDDB-relay, Unom: 24 VAC/DC, low temperature, time range 1...10 s

Timer relay
TDDB

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

Mors Smitt Asia Ltd.
Unit B & C, 25/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 Ltd.
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
sales.msbv@wabtec.com

Mors Smitt Technologies Ltd.
1010 Johnson Drive,
Buffalo Grove, IL 60089-6918, USA
Tel: +1 847 777 6497
salesmst@wabtec.com

RMS Mors Smitt
6 Anzed Court,
Mulgrave, VIC 3170, Australia
Tel: +61 (0)3 8544 1200
sales.rms@wabtec.com

(c) Copyright 2019

All rights reserved. Nothing from this edition may be multiplied, or made public in any form or manner, either electronically, mechanically, by photocopying, recording, or in any manner, without prior written consent from Mors Smitt. This also applies to accompanying drawings and diagrams. Due to a policy of continuous development Mors Smitt reserves the right to alter the equipment specification and description outlined in this datasheet without prior notice and no part of this publication shall be deemed to be part of any contract for the equipment unless specifically referred to as an inclusion within such contract. Mors Smitt does not warrant that any of the information contained herein is complete, accurate, free from potential errors, or fit for any particular purpose. Mors Smitt does not accept any responsibility arising from any party's use of the information in this document.