

motive

manual addendum  
brake motors  
**DELPHI AT... Ex**





**II 3G Ex nA IIB T4 Gc**  
**II 3D Ex tc IIIB T120°C Dc**  
**Tamb=-20 +40 °C**

#### Reference list:

Norm (last issue)	Title
Dir. 2014/34/EU	Equipment and Protective systems intended for use in Potentially Explosive Atmospheres. Safety requirements
EN60079-0:2018	Explosive atmospheres - Part 0: Equipment - General requirements
EN60079-15:2010	Electrical apparatus for explosive gas atmospheres - Part 15: Construction, test and marking of type of protection, "n" electrical apparatus
EN 60079-31:2014	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

#### Field of application

The person authorized to do the work is responsible for the zones sharing. He must follow the norms EN 60079-31 and EN60079-14 (whenever their application is possible) when choosing the suitable motor.

Motive Delphi AT.. Ex brake motors are designed to be used in the zone 22 (II 3 D T120°C) and/or zone 2 (II 3 G T4), according to the classification stated in the plate, and for the voltage and frequency field A described by the norm EN 60034 part 1 Cap. 6.3.

The eventual dust deposits mustn't have a thickness > 5mm.

#### Conformity declaration

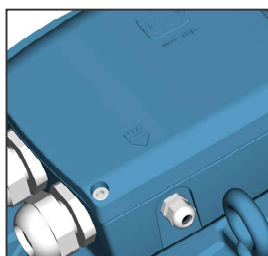
The conformity declaration reported in this addendum, is the document that testifies the product conformity to the Directive 2014/34/EU.

The validity of such certificate is related to the respect of the instructions specified in the use and maintenance manual, together with the following additional instructions.

#### Additional instructions

The persons authorized to do the work in an ambient exposed to explosion risk must be instructed about the right procedure for the use of the motor, respecting all norms related to safety, installation and use.

Motors must be protected against over-heating by suitable control means that must be chosen, considering the working conditions, according to the norm EN60079-15, EN60079-0 and EN60079-31.



All Motive Delphi-Ex motors are standard equipped with temperature sensors (3 PTC thermistors with a response threshold calibrated according to the temperature class and the maximum ambient operating temperature), to be connected to a suitable tripping device as per EN 50495 standard.

**It is forbidden to open the terminal box to connect electric wires or make any intervention in presence of explosive atmosphere. Before any of such operations, disconnect the motor from the electric power supply and avoid the possibility of any accidental switching on of the motor.**

ATDC, AT24 and ATTD motors with brakes can be used in potential explosive atmospheres in the zone 22 (II 3 D T120°C) and/or zone 2 (II 3 G T4) only if used as a parking brake.

The special condition regarding the mandatory use of the PTC depends on the following:

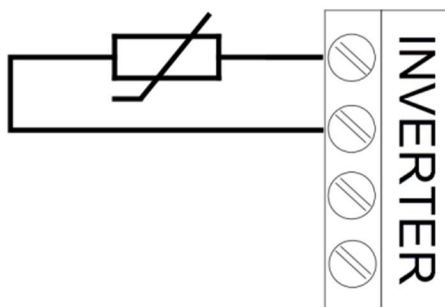
- In the case of mains power supply (DOL), the internal temperature sensors must be connected to a suitable tripping device in order to create a system compliant with standard EN50495 with:
  - Hardware fault tolerance EUC = 0;
  - Safety Integrity Level SIL = 1 (with reference to standard EN 61508)
- For VFD power supply, the internal temperature sensor must be connected:
  - directly to the inverter terminals
  - or as per the DOL installation.

**Maintenance warnings:** clean the motor only with a wet or antistatic cloth.

### Use with converters

When Delphi AT.. Ex brake motors are used with converters, in addition to the general selection criteria (limit values: rated voltage <830V, peak voltage <2,2kV, voltage gradients <2,2kV/1µs), consideration should be given the following points:

- Motors powered by inverter have a voltage (or current) which is not purely sinusoidal.  
This leads to an increase in losses, vibration, noise, and a different temperature rise.
- Possibility of spikes is linked to the value of the converter power supply voltage and the length of the motor power cable.  
To limit the phenomenon, it's advisable to use specific filters connected between the converter and the motor (mandatory for motor power cables over 50 mt).  
All Delphi AT.. Ex brake motors are equipped as standard with a reinforcing Nomex film between phases to protect against the voltage peaks.
- The correct grounding of the motor and the driven machine is very important to avoid voltage and stray currents in the bearings.  
To prevent the current circulation in the bearing if the motor it is not equipped with an insulated bearing, use a proper filter to reduce the high frequency harmonic voltage above 50kHz.
- It's mandatory connect thermal probes to the converter to safeguard the motor from the overheating which could be generate by a misuse.



These probes have two terminals for connection marked with a label and located inside the main terminal box.

The grounding must be carried out (using the supplied galvanized screw and spring washer) both inside the terminal box (fig.1) and at the designated fastening point on the motor housing (fig.2).

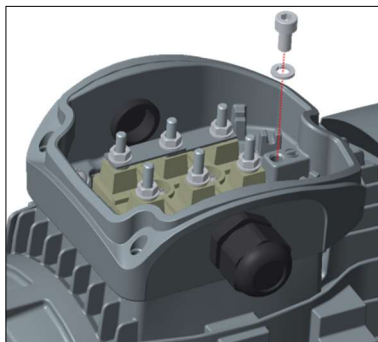


fig.1

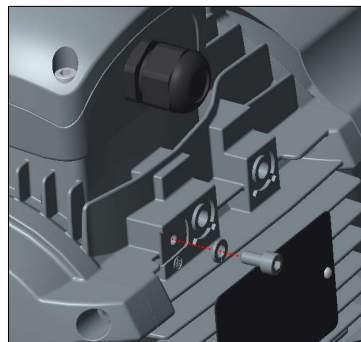


fig.2

The cross-section of the grounding wire connected to the motor housing must comply with Table 12 (EN 60079-0).

**Table 12 – Minimum cross-sectional area of PE conductors**

Cross-sectional area of phase conductors, $S$ mm <sup>2</sup>	Minimum cross-sectional area of the corresponding PE conductor, $S_p$ mm <sup>2</sup>
$S \leq 16$	$S$
$16 < S \leq 35$	16
$S > 35$	$0,5 S$

For proper tightening of the terminal box nuts and grounding screws, please refer to the table below.

	M4	M5	M6	M8	M10	M12	M16	M20
Nm	2	3,2	5	10	20	35	65	100-110

For inverter supply, the switching frequency must be higher than 4kHz (PWM type), with an output frequency range of 0–120Hz for 2-pole motors / 0–150Hz for 4-6-8 pole motors.

- The installation of ATEX forced ventilation is mandatory if the motor is used at frequencies below 50Hz with constant load torque (see graph below).

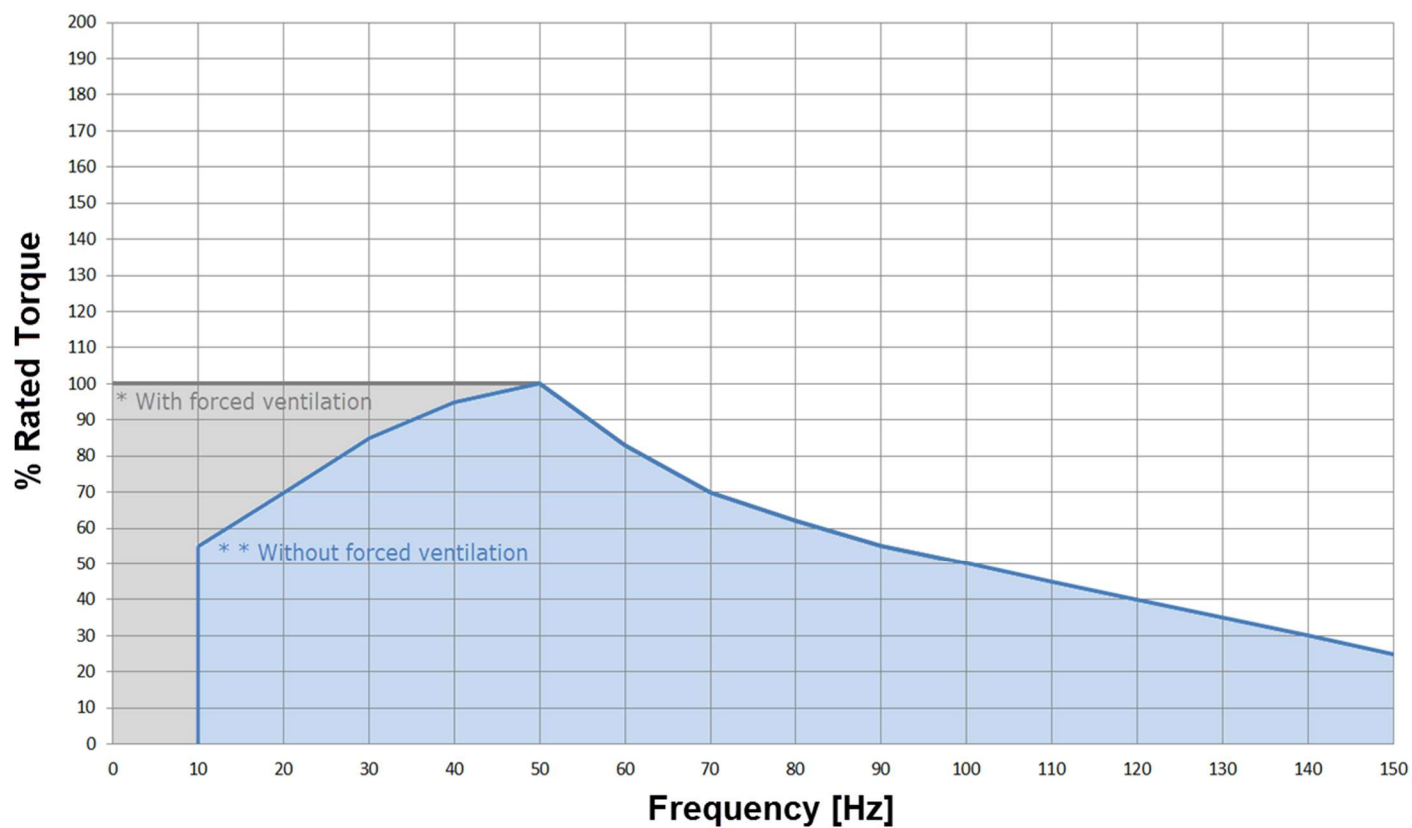
Motive provides its certified ATEX forced ventilation:

II 2G Ex IIC T4 Gb

II 2D Ex IIIC T120°C Db

Tamb = -20 +40 °C

If the motor is used at frequencies lower than 50Hz at quadratic torque load, please refer to the following graph for the maximum percentage of torque load admitted.



For motor Speed/Torque curves, refer to following link: <https://www.motive.it/en/rapporti.php>

## Electrical and thermal protections

Protections must be chosen based on the specific running conditions, according to standards EN60079-14 and EN61241-14.

### External protections:

- Protection against overcurrent and short-circuits; this protection can be made with the magnetothermal circuit breaker or with fuses; these must be calibrated on the motor current.
- Protection against overload by thermal relay that controls a power line contactor upstream the motor.
- If the application requires, protection against excessive speed of the electric motor, for example if the mechanical load may drive the electric motor itself and thereby create a hazardous situation.
- If special conditions or synchronised operation with other machines or parts of machines require it, protection against power failures or dips by means of a minimum voltage relay that controls an automatic power knife switch.

### Internal protections:

The electrical protections on the motor power supply may not be sufficient to protect against overloads.

Connecting built-in protections on the windings solves this problem:

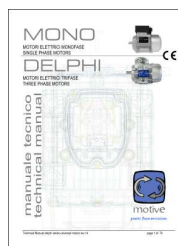
- PTC thermistor (a device whose resistance increases sharply once the intervention temperature is reached).  
All Motive Delphi AT.. Ex self-braking motors are equipped as standard with 3 PTC thermistors.

## Power cable entry (DELPHI 3PH EX)

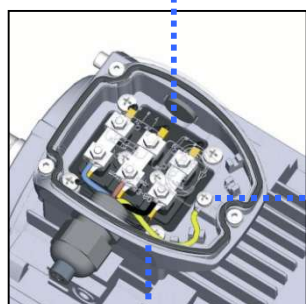
Motor Type	56	63-100	112	132	160-180	200-225	250-355	400
Cable gland / cap as standard	2xM16	2xM20	2xM25	2xM32	2xM40	2xM50	2xM63	3xM63
Cable gland services as standard					1xM16	1xM16	1xM16	1xM16
Auxiliary inlet cable gland*		1xM16	1xM16	1xM16				

\* with larger connection box: on request, or as standard with the addition of heaters, PT100 or for ATDC motors.

## PECULIAR FEATURES OF DELPHI AT.. Ex 3GD BRAKE MOTORS



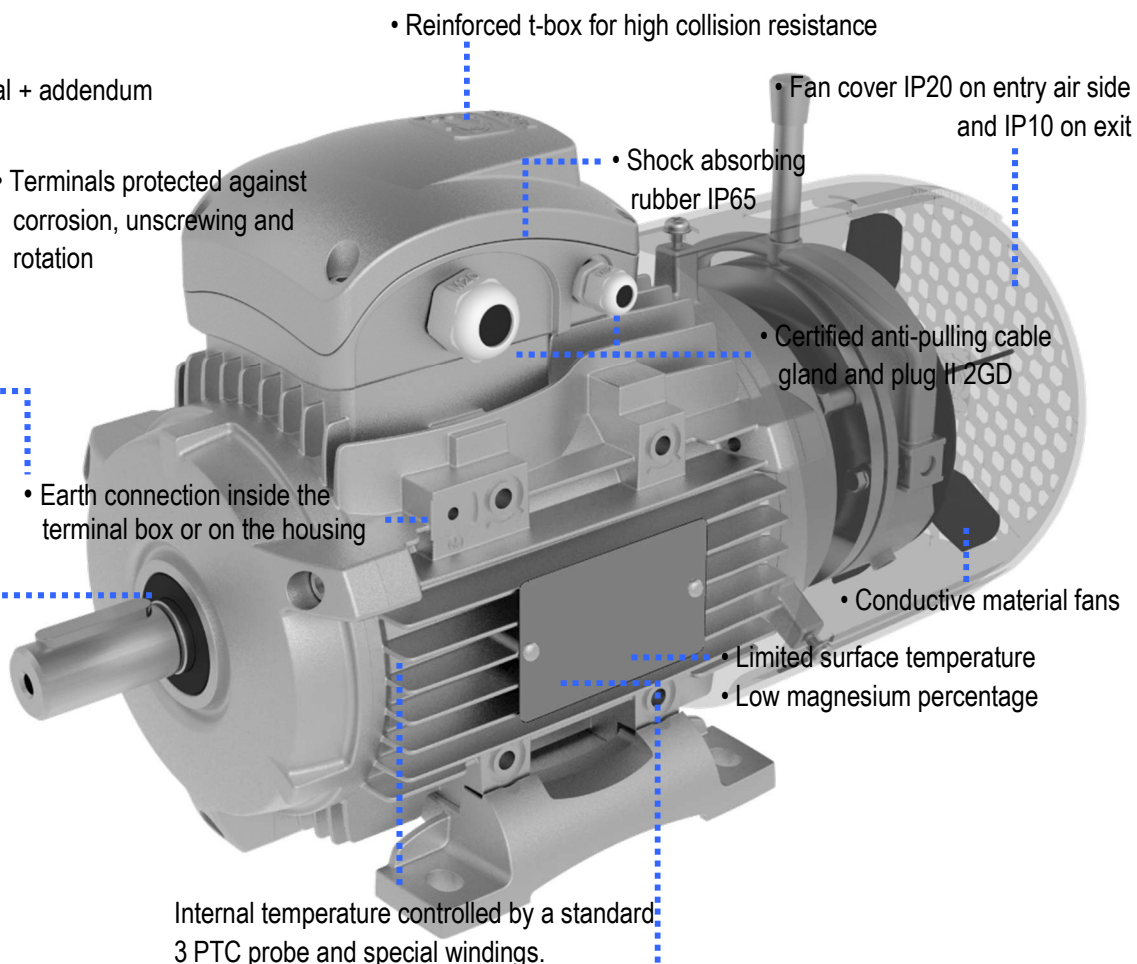
User manual + addendum







- Terminals protected against corrosion, unscrewing and rotation

- Earth connection inside the terminal box or on the housing

- Dust exclusion IP65



		<b>motive</b>					
<a href="http://www.motive.it">www.motive.it</a>		MADE IN ITALY		50Hz		TROPICALIZED 3-IEC 60034-1	
		II 3G Ex nA IIB T4 Gc		II 3D Ex tc IIIB T120°C Dc		Tamb=-20 +40 °C	
Protection against explosion		TYPE		IN*		YYMM production date	
Motor type		I.C.L.F   IP65   S1   COSφ		Hz		kW	
IP Protection index		Δ-V-Y		rpm		A	

Manufacturer's mark

Protection against explosion

Motor type

IP Protection index

YYMM production date  
Serial number

## DELPHI AT.. Ex 3GD CLASSIFICATION

For GAS **G (zone 2)**

<b>CE</b>	<b>Ex</b>	<b>II</b>	<b>3</b>	<b>G</b>	<b>Ex</b>	<b>nA</b>	<b>IIB</b>	<b>T4</b>	<b>Gc</b>
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

①	CE marking
②	ATEX code for prevention of explosion
③	Surface industries
④	Infrequent, short-term danger
⑤	Protection against gas combustion (zone 2)
⑥	Explosion protection: International
⑦	Non-sparking
⑧	For instance, for Ethylene. Equipment marked as suitable for Group IIB is also suitable for IIA
⑨	T4 for maximum surface temperature of 135°C
⑩	Extended level of protection in hazardous zones with explosive gas mixtures

For DUST **D (zone 22)**

<b>CE</b>	<b>Ex</b>	<b>II</b>	<b>3</b>	<b>D</b>	<b>Ex</b>	<b>tc</b>	<b>IIIB</b>	<b>T120°C</b>	<b>Dc</b>
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

①	CE marking
②	ATEX code for prevention of explosion
③	Surface industries
④	Place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but if it does occur, it will persist for a short period only
⑤	Protection against dust combustion (zone 22)
⑥	Explosion protection: International
⑦	Enclosure protection
⑧	For non-conductive dust such as flour, grain, wood and plastic
⑨	Maximum surface temperature of 120°C
⑩	Extended level of protection in flammable dust atmospheres



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## Declaration of EU conformity

Motive srl based in Castenedolo (BS) - Italy

declares as manufacturer, under its own exclusive responsibility, that its range of

**asynchronous electric motors of the series "DELPHI AT.. Ex"**

complies with the following directives:

- EC Directive 2014/34/EU: concerning "equipment and Protective systems intended for use in Potentially Explosive Atmospheres"

Marking:



II 3G Ex nA II B T4 Gc  
II 3D Ex tc II B T120°C Dc  
Tamb = -20 +40 °C

as in accordance to the European Standards:

- IEC 60034-5:2000/A1:2006 Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification Internal methods Tests not related to standards, developed by laboratory or under client's specification
- EN 60079-0:2018 Explosive atmospheres – Part 0: Equipment – General requirements
- EN 60079-7:2015+AMD1:2017 Explosive atmospheres – Part 7: Equipment protection by increased safety "e"
- EN 60079-31:2014 Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure "t"
- IEC 60204-1:2005 Safety of machinery – Electrical equipment of machines – Part 1: General requirements

The machines are supplied without electrical connections to the control panels or any pneumatic and hydraulic supply connections.

It is therefore forbidden to use them until the plant into which they are incorporated has been declared as compliant with the provisions of the Machinery Directive 2006/42/EC and Directive 2014/34/EU and plant's analysis was not done as compliant with Directive 99/92/EC.

Castenedolo, 5<sup>th</sup> March 2025  
The legal Representative

