Operating and maintenance manual for HAWE devices

For intended use in explosive atmospheres

For the areas of areas

- EU: ATEX (Directive 2014/34/EU)
- International: IECEx
- USA: NEC, MSHA
- Canada: CEC
- Australia: ANZEx
- China: MA
- Russia: TR ZU
- and others.

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HAWE HYDRAULIK

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Contents

1 General

The fluid product has been designed, manufactured and tested using internationally applicable guidelines and harmonised standards, and left the HAWE plant in a safe and fault-free condition. To maintain this condition and ensure safe operation, operators must observe the information and warnings in this operating and maintenance manual.

The fluid-technical product must only be installed and integrated into a hydraulic system by a qualified technician, who is familiar with and works according to the generally accepted engineering standards and the latest legal regulations and standards of explosion protection. Furthermore, the special features of the application and/or operation environment must be carefully assessed and taken into account.

1.1 Use

In the ATEX directive 2014/34/EU, the fluid product is assigned to equipment group II category 2 and category 3 or equipment group I category M2 and can be used in zones 1, 2, 21, 22 in accordance with 1999/92/EC or in zone M2. The component is intended for use in areas where there are explosive gas/air and/or dust/air mixtures, mists or vapours.

In accordance with ISO 80079-36:2016 and ISO 80079-37:2016, the fluid product is assigned to the type of protection "c" with a maximum surface temperature of 135°C, or temperature class T4. The standard EN 60079-0 and the corresponding parts of this series of standards apply to the solenoids.

ATEX-compliant solenoids and displacement transducers may only be operated using product-specific operating and maintenance manuals and in the permissible ambient temperature range.

Around the world, other certificates and unit approval tests are regionally required in addition to ATEX. For a rough map, see Chapter 1.2, "Identification".

NOTE
For a more precise list of all order codings and the assigned classifications, see Chapter 3, "Order coding, classification and usage".

1.2 Identification

Name and address of manufacturer

Headquarters
HAWE Hydraulik SE
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85609 Aschheim/Munich
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Germany
Tel. +49 89 37 91 00 - 1000
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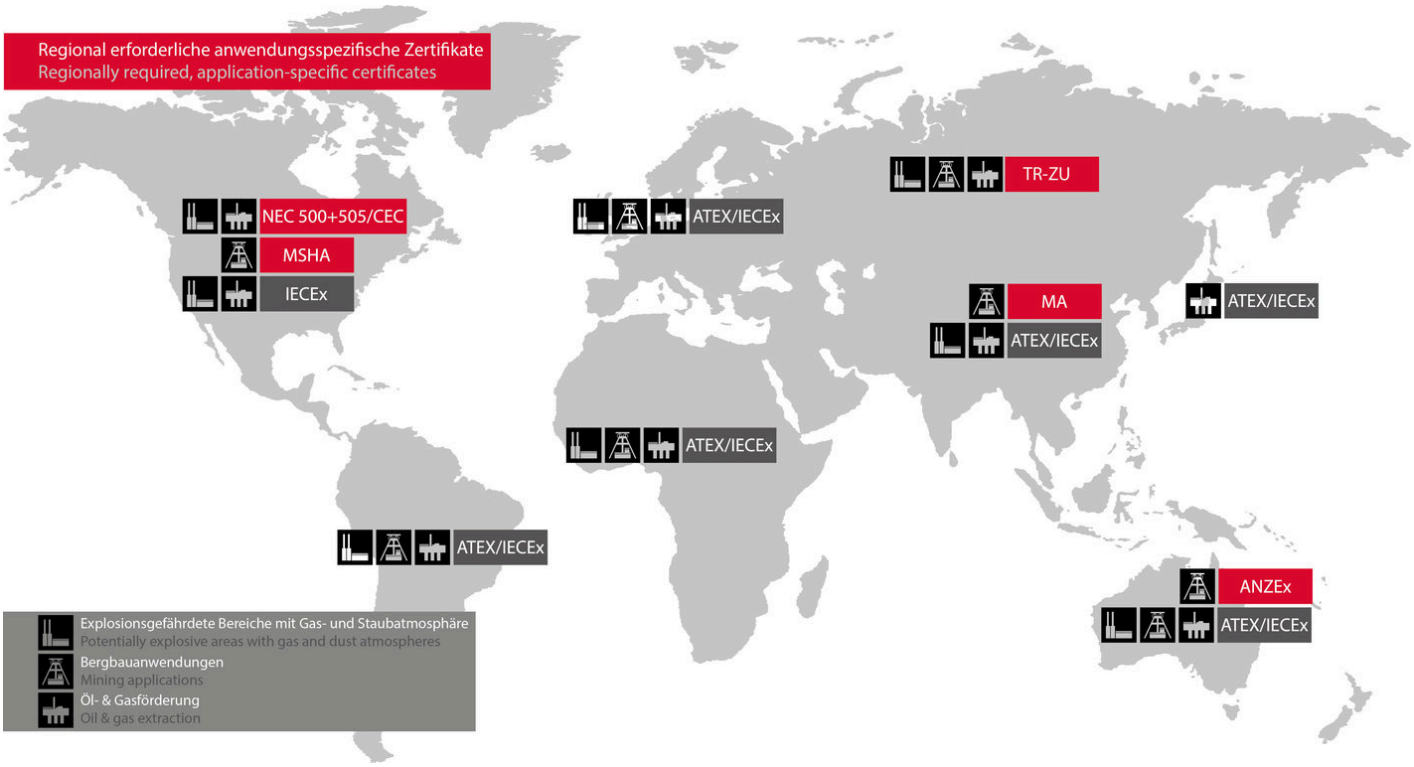
e-mail: info@hawe.de
www.hawe.com

Device type and manufacturing date: see type plate

Reference number for technical documentation: on request



2 Assembly, installation and disassembly

The fluid product is to be attached to a level mounting surface. Commercially available, ATEX-compliant (if applicable) connecting elements (fittings, hoses, tubes, etc.) from reputable manufacturers should be used to integrate the product into the hydraulic system. The hydraulic system must be decommissioned and depressurised in line with regulations (particularly in the case of systems with hydraulic accumulators) before removing the product.

In this regard, also see the notes in General operating manual for the assembly, initial operation and maintenance of hydraulic components and systems: B 5488

2.1 Initial operation and settings

Operation of fluid-technical products is only permissible if installed according to mounting regulations. The device must be separately connected to ground in case dangerous potential differences occur (e.g. with insulated mounting) and if it is not guaranteed that the fluid-technical piping system will establish a reliable connection to those components that are connected to ground.The manufacturer will generally deliver the device with the settings applied. Alternatively, the customer can also apply or adjust these settings. In this case the customer must refer to the instructions provided in the valid documentation for the specific device.

In this regard, also see the notes in General operating manual for the assembly, initial operation and maintenance of hydraulic components and systems: B 5488

2.2 Maintenance, service and troubleshooting

The fluid-technical product requires almost no maintenance. All hydraulic connections must be checked regularly - at least once every year - for possible damages (visual check). In case of external leakage the system must be taken out of operation and repaired. The user has to make sure that possibly vaporized ingredients of the escaped pressure fluid do not cause any danger when blended with surrounding explosion hazardous atmosphere. The use of fire inhibiting fluids or mechanical shielding is recommended in such cases. The surface of the device must be checked regularly - at least once every year - for dust deposits, which should then be cleaned off.

The product-specific technical documentation specifies any other necessary maintenance work required to ensure safe and stable operation of the device. It is assumed that the generally known and applicable recommendations for service and operation of hydraulic systems are complied with.

In this regard, also see the notes in General operating manual for the assembly, initial operation and maintenance of hydraulic components and systems: B 5488

2.3 Safety notes

General

In addition to the EC Directive 2014/34/EU and the national transpositions (the Product Safety Act (Produktsicherheitsgesetz, ProdSG) in Germany), European [Directive 2014/34/EU [sic.]] Directive 1999/92/EC (ATEX operational directive) and its transpositions (in Germany the Industrial Safety Regulation (Betriebssicherheitsverordnung, BetrSichV)) apply in particular for operators.

Please observe the following

- Immediately shut down the device if a malfunction, corrosion or damage occurs.
- The maximum permissible pressure fluid temperature of 70°C must not be exceeded anywhere in the hydraulic system.
- The heat dissipation must not be impaired. Deposits on the surface must always be avoided where possible.
- The device must not be covered and must not be operated in the direct vicinity of heat sources.
- Solar radiation must be avoided.
- The type plate or the type engraving must not be removed or rendered illegible.
- The type coding and the ATEX classification must not be removed.
- The device may not be coated without consulting the manufacturer.
- The cable must be installed in a fixed position with a minimum bending radius of 110 mm.
- Only install spare parts, e.g. solenoids, on ATEX-compliant devices with ATEX-compliant classification.
- Calculation of the duty cycle ED: Duty cycle [%] = $t_{energised}$ [sec] / t_{cycle} [sec] with $t_{cycle\ max}$ = 300 sec

CAUTION

Danger of burning due to hot metal surfaces!

Risk of minor injury

- Wear gloves.
- Allow the device to cool down for at least 10 minutes before touching it.

Product-specific

Single pumps, cover plate version and hydraulic power packs: In accordance with ISO 80079-36 and ISO 80079-37, in terms of content, moving parts which are protected by being immersed in a fluid are sufficiently protected against ignition from the atmosphere through the arrangement of a monitoring element (e.g. level gauge, level switch) that displays any non-permitted loss of protective fluid (this means pumps are to be operated in an oil-submerged arrangement). For improved safety, any non-permitted heating of the protective fluid is to be monitored by a temperature switch. Furthermore, for the self-installation of pumps in tank containers, an ATEX-compliant coupling must be used.

Pressure switches, directional seated valves and directional spool valves with electromechanical contact switches: The contact switches installed in pressure switches in accordance with D 5440 and in directional seated valves and directional spool valves with switching position monitoring are simple electrical equipment in the sense of EN 60079-11, subchapter 5.7, which do not have any special marking. In potentially explosive atmospheres they must be operated in an intrinsically safe circuit with isolation switch amplifier and are assigned to temperature class T6 in Group II in accordance with DIN 50020.

Hydraulic accumulators: Hydraulic accumulators do not have a heating system. Their surface temperature depends on the operation condition and the temperature of the pressure fluid. A re-check of the max. surface temperature, based on the customer specifications for working conditions, will be undertaken by the manufacturer on the product and will be documented.

Intrinsically save components: Components with a solenoid classification Ex I M2 Ex d ib I fulfil this classification only if used in combination with a “ib”- power supply of category M2.

NOTE

The classification of the type of protection is only valid if it is not restricted through the use of the device with other components (e.g. on a hydraulic power pack or with integration into a complete system) and their lower classification. In this case, the lowest classification applies. If necessary, the operating and maintenance manual for the electromagnet and its ATEX classification must be observed.

Failure to comply with these regulations will result in loss of warranty claims against HAWE Hydraulik.

3 Order coding, classification and usage

3.1 Non-electrical part or purely mechanical component

Order coding	Certified according to	Classification / marking	Certificate of unit approval	Declaration of conformity	Operating and maintenance manual	Permissible ambient temperature
...-EX	**ATEX** **EU** **EU**	Ex II 2 G Ex h IIC T4 Gb Ex II 2 D Ex h IIIC T135°C Db [1]		On request	B ATEX	-20°C...+40°C

[1] **refer to note in the chapter "Safety instructions"**

3.2 Displacement transducers

Explosion protection – explosive atmospheres of gas/air or dust/air mixtures, mists or vapours

Order coding	Certified according to	Classification / marking	Certificate of unit approval	Operating and maintenance manual(s) incl. declaration of conformity	Permissible ambient temperature
...-EX	ATEX EU	Ex I M2 Ex db ib I Mb	IBExU09ATEX 1001 X	B ATEX, B 10/2008 (EX09)	-30°C...+70°C
		Ex II 2G Ex db IIB+H2 T4 Gb			
		Ex II 2D Ex tb IIIC T 135°C Db			
	IECEx International	Ex db ib I Mb	IECEx IBE11.0004 X		
		Ex db IIB+H2 T4 Gb			
		Ex tb IIIC T135°C Db			

Explosion protection – mining, mine gas and/or combustible dusts

Order coding	Certified according to	Classification / marking	Certificate of unit approval	Operating and maintenance manual(s) incl. declaration of conformity	Permissible ambient temperature
...-M2FP	ATEX EU	Ex I M2 Ex db ib I Mb	IBExU09ATEX 1001 X	B ATEX, B 10/2008 (EX09)	-30°C...+40°C
		Ex II 2G Ex db IIB+H2 T4 Gb			
		Ex II 2D Ex tb IIIC T135°C Db			
	IECEx International	Ex db ib I Mb	IECEx IBE11.0004 X		
		Ex db IIB+H2 T4 Gb			
		Ex tb IIIC T135°C Db			
	ANZEx Australia	ANZEx 11.3007X	ANZEx11.3007 X		
...-IS	ATEX EU	Ex I M1 Ex ia I Ma	IBExU14ATEX 1300 X	B ATEX, B 31/2013 (EX16)	-40°C...+70°C
	IECEx International	Ex ia I Ma	IECEx IBE 14.0081 X		

3.3 Single-action solenoid (for type BVG1, BVE1, NBVP16, G(1), NG(1), VP1, HSV21, HSV22, SW1, SW2, SWR2, SWP2, NSWP2)

Explosion protection – explosive atmospheres of gas/air or dust/air mixtures, mists or vapours

Order coding	Certified according to	Classification / marking	Certificate of unit approval	Operating and maintenance manual with declaration of conformity	Permissible ambient temperature
...-X 24 EX 55 FM	**ATEX EU**	Ⓔx II 2G Ex db IIB+H2 T4 Gb	FM 18ATEX0019 X	B ATEX, B 40/2017 (EX22)	-40°C...+55°C The duty cycle ED [%] depends on the ambient temperature and the cable type being used.
		Ⓔx II 2D Ex tb IIIC T135°C Db			
	IECEx International	Ex db IIB+H2 T4 Gb	IECEX FMG 18.0007X	B ATEX, B 40/2017 (EX22)	
		Ex tb IIIC T135°C Db			
	NEC	Class I Div. 1 Gp B,C,D T4	FM 18US0024 X	B ATEX, B 40/2017 (EX22)	
		Class II Div. 1 Gp E,F,G T4			
		Class III Div. 1 & 2			
		Class I Zone 1, AEx db IIB+H2 T4 Zone 21, AEx tb IIC T135°C			
	CEC	Ex db IIB+H2 T4 Gb	FM 18CA0012 X	B ATEX, B 40/2017 (EX22)	
		Ex tb IIIC T135°C Db			
		Class I Div. 1 Gp B,C,D T4			
		Class II Div. 1 Gp E,F,G T4			
		Class III Div. 1 & 2			
...-G 24 EX[1)]	**ATEX EU**	Ⓔx II 2G Ex db IIB+H2 T4 Gb	TÜV-A 12ATEX0006 X	B ATEX, B 03/2004 (EX02)	-35°C...+40°C
		Ⓔx II 2D Ex tb IIIC T135°C Db			

	Ambient temperature	
Cable type	**40°C**	**55°C**
90°C	Duty cycle 50%	Duty cycle 25%
105°C	Duty cycle 75%	Duty cycle 50%
125°C	Duty cycle 100%	Duty cycle 100%

Definition of the duty cycle ED [%]: see chapter "Safety instructions "

[1)] **Not type BVE1, SW1**

Explosion protection – explosive atmospheres of gas/air or dust/air mixtures, mists or vapours

Order coding	Certified according to	Classification / marking	Certificate of unit approval	Operating and maintenance manual with declaration of conformity	Permissible ambient temperature
...-G 24 EX 55 FM [1)2)3)]	ATEX EU	Ⓔx II 2G Ex db IIB+H2 T4 Gb	FM 13ATEX0071 X	B ATEX, B 24/2012 (EX14)	-40°C...+55°C
		Ⓔx II 2D Ex tb IIIC T135°C Db			
	IECEx International	Ex db IIB+H2 T4 Gb	IECEx FMG 13.0027X		
		Ex tb IIIC T135°C Db			
	NEC 500, NEC 505, CEC USA, Canada	**NEC 500, CEC:** ▪ Class I, Div. 1, Grp B, C,D T4	3046447, 3046447C		
		NEC 500: ▪ Class II/III, Div. 1, Grp E,F,G T4			
		NEC 505: ▪ Class I, Zone 1, AEx d, IIB+H2 T4 Gb			
		NEC 506: ▪ Zone 21, AEx tb, IIIC T135°C Db			
		CEC sect. 18: ▪ Class I, Zone 1, Ex db, IIB+H2 T4 Gb ▪ Zone 21, Ex tb, IIIC T135°C Db			
	TR - ZU Russia and others	▪ Ex1 d IIB+H2 T4 Gb ▪ Ex1 tb IIIC T135°C Db	RU C-DE.GB08.B.01733	B 37/2016 (EX14)	

Explosion protection – mining, mine gas and/or combustible dusts

Order coding	Certified according to	Classification / marking	Certificate of unit approval	Operating and maintenance manual with declaration of conformity	Permissible ambient temperature
...-G 24 M2FP	ANZEx Australia	Ex d I Mb	ANZEx12.4117 X	B ATEX, B 23/2011 (EX13)	-20°C...+40°C

1) Limiting for directional seated valves BVG, NBVP 16 (versions with one solenoid), G size 1, VP 1: S1 (100% duty cycle) up to max. 50°C; 90% duty cycle at 50 to 55°C
2) Limiting for directional seated valves BVE size 1, NBVP 16 (versions with one solenoid), G size 1, VP 1: S1 (100% duty cycle) up to max. 50°C; 80% duty cycle at 50 to 55°C
3) Not type SW1

3.4 Twin solenoid (for type PSL, PSV, PSM, PSLF, PSVF size 3, 5, 7, type PMZ 1)

Explosion protection – explosive atmospheres of gas/air or dust/air mixtures, mists or vapours

Order coding	Certified according to	Classification / marking	Certificate of unit approval	Operating and maintenance manual with declaration of conformity	Permissible ambient temperature
...-X 24 TEX 4 70 FM	**ATEX EU**	Ⓔx II 2G Ex db IIB T4 Gb	FM 18 ATEX0032 X	B ATEX B 41/2017 (EX 23)	-40°C ...+70°C The duty cycle ED [%] depends on the ambient temperature and the cable type being used.
		Ⓔx II 2D Ex tb IIIC T135°C Db			
	IECEx International	Ex db IIB T4 Gb	IECEx FMG 18.0010X	B ATEX, B 41/2017 (EX 23)	
		Ex tb IIIC T135°C Db			
	NEC	Class I Div. 1 Gp C,D T4	FM 18US0089 X	B ATEX B 41/2017 (EX 23)	
		Class II Div. 1 Gp E,F,G T4			
		Class III Div. 1 & 2			
		Class I Zone 1, AEx db IIB T4 Zone 21, AEx tb IIC T135°C			
	CEC	Ex db IIB T4 Gb	FM 18CA0045 X	B ATEX B 41/2017 (EX 23)	
		Ex tb IIIC T135°C Db			
		Class I Div. 1 Gp C,D T4			
		Class II Div. 1 Gp E,F,G T4			
		Class III Div. 1 & 2			
...-G 24 EX **...-G 24 EX 4** **...-G 24 TEX** **...-G 24 TEX 4**	**ATEX EU**	Ⓔx II 2 G Ex mb II 120°C (T4) Gb	TÜV-A 12ATEX0005 X	B ATEX, B 01/2002 (EX01)	-35°C...+40°C
		Ⓔx II 2 D Ex mb IIIC T120°C Db			
...-G 24 TEX 55 **...-G 24 TEX 4 55**	**ATEX EU**	Ⓔx II 2G Ex db IIB+H2 T4 Gb	IBExU11ATEX1109 X	B ATEX, B 19/2011 (EX08)	-25°C...+55°C
		Ⓔx II 2D Ex tb IIIC T135°C Db			
	IECEx International	Ex db IIB+H2 T4 Gb	IECEx IBE 11.0016 X		
		Ex tb IIIC T135°C Db			

	Ambient temperature		
Cable type	**40°C**	**55°C**	**70°C**
90°C	Duty cycle 100%	Duty cycle 50%	Duty cycle 25%
105°C	Duty cycle 100%	Duty cycle 100%	Duty cycle 75%
125°C	Duty cycle 100%	Duty cycle 100%	Duty cycle 100%

Definition of the duty cycle ED [%]: see chapter "Safety instructions "

Order coding	Certified according to	Classification / marking	Certificate of unit approval	Operating and maintenance manual with declaration of conformity	Permissible ambient temperature
...-G 24 TEX 70	**ATEX EU**	Ⓔx II 2G Ex db IIB+H2 T4 Gb	IBExU07ATEX1089 X	B ATEX, B 09/2006 (EX06)	-20°C...+70°C
		Ⓔx II 2D Ex tb IIIC T135°C Db			
	IECEx International	Ex db IIB+H2 T4 Gb	IECEx IBE09.0005X		
		Ex tb IIIC T135°C Db			
...-G 24 TEX 4 55 FM	**ATEX EU**	Ⓔx II 2G Ex db IIB+H2 T4 Gb	FMG 13ATEX 0077X	B ATEX, B 22/2011 (EX11)	-40°C...+55°C
		Ⓔx II 2D Ex tb IIIC T135°C Db			
	IECEx International	Ex db IIB+H2 T4 Gb	IECEx FMG 13.0029 X		
		Ex tb IIIC T135°C Db			
	NEC 500, NEC 505, CEC USA, Canada	**NEC 500, CEC:** ▪ Class I, Div. 1, Grp C, D T4	3044176, 3047928C		
		NEC 500: ▪ Class II/III, Div. 1, Grp E, F, G T4			
		NEC 505: ▪ Class I, Zone 1, AEx d, IIB+H2 T4 Gb			
		NEC 506: ▪ Zone 21, AEx tb, IIIC T135°C Db			
		CEC sect. 18: ▪ Class I, Zone 1, Ex db, IIB+H2 T4 Gb ▪ Zone 21, Ex tb, IIIC T135°C Db			
	TR - ZU Russia and others	Ex1 d IIB+H2 T4 Gb	TC RU C-DE.GB08.B.01733	B 35/2016 (EX 11)	
		Ex1 tb IIIC T135°C Db			

Explosion protection – explosive atmospheres of gas/air or dust/air mixtures, mists or vapours

Order coding	Certified according to	Classification / marking	Certificate of unit approval	Operating and maintenance manual with declaration of conformity	Permissible ambient temperature
...-G 24 TEX 70 FM	ATEX EU	Ⓔx II 2G Ex db IIB+H2 T4 Gb	FMG 13ATEX 0077X	B ATEX, B 21/2011 (EX12)	-40°C...+70°C
		Ⓔx II 2D Ex tb IIIC T135°C Db			
	IECEx International	Ex db IIB+H2 T4 Gb	IECEx FMG 13.0029 X		
		Ex tb IIIC T135°C Db			
	NEC 500, NEC 505, CEC USA, Canada	**NEC 500, CEC:** ▪ Class I, Div. 1, Grp C, D T4	3044176, 3047928C		
		NEC 500: ▪ Class II/III, Div. 1, Grp E, F, G T4			
		NEC 505: ▪ Class I, Zone 1, AEx d, IIB+H2 T4 Gb			
		NEC 506: ▪ Zone 21, AEx tb, IIIC T 135°C Db			
		CEC sect. 18: ▪ Class I, Zone 1, Ex db IIB+H2 T4 Gb ▪ Zone 21, Ex tb, IIIC T135°C Db			
	TR - ZU Russia and others	Ex1 d IIB+H2 T4 Gb	RU GDE.GB08.B.01733	B 36/2016 (EX12)	
		Ex1 tb IIIC T135°C Db			

Explosion protection – mining, mine gas and/or combustible dusts

Order coding	Certified according to	Classification	Certificate of unit approval	Operating and maintenance manual with declaration of conformity	Permissible ambient temperature
...-G 24 MSHA	**ATEX EU**	Ex I M2 Ex db ib I Mb	IBExU05ATEX1115 X	B ATEX, B 04/2005 (EX05)	-20°C...+40°C
	IECEx International	Ex db ib I Mb	IECEx IBE09.0004X		
	MSHA USA	30CFR Part 18 Cert. No. 18-NXA050003-0	18-NXA050003-0		
	MA China	Ex d ib I Mb	J2012078		
...-G 24 M2FP	**ATEX EU**	Ex I M2 Ex db ib I Mb	IBExU05ATEX1115 X	B ATEX, B 04/2005 (EX05)	-20°C...+40°C
	IECEx International	Ex db ib I Mb	IECEx IBE 09.0004X		
	ANZEx Australia	ANZEx 10.3019X	ANZEx 10.3019X		
	MA China	Ex d ib I Mb	J2012078		
...-G 12 IS	**ATEX EU**	Ex I M1 Ex db ia I Ma	IBExU05ATEX1116 X	B ATEX, B 17/2011 (EX05)	-20°C...+40°C
	IECEx International	Ex db ia I Ma	IECEx IBE 09.0006X		
	MA China	Ex ia I Ma	J2012077		
	TR Russia and others	PO Ex ia I Ma X	TC RU C-DE.GB08.B.00111	B 30/2013 (EX05)	

3.5 Twin solenoid (for type PSL, PSV size 2, type PMZ 01)

Explosion protection – explosive atmospheres of gas/air or dust/air mixtures, mists or vapours

Order coding	Certified according to	Classification	Certificate of unit approval	Operating and maintenance manual with declaration of conformity	Permissible ambient temperature
...-G 24 TEX 4 55 FM	ATEX EU	Ⓔx II 2G Ex db IIB+H2 T4 Gb	FM 15ATEX 0012 X	B ATEX, B 28/2012 (EX04)	-40°C...+55°C
		Ⓔx II 2D Ex tb IIIC T135°C Db			
	IECEx International	Ex db IIB+H2 T4 Gb	IECEx FMG 15.0007X		
		Ex tb IIIC T135°C Db			
	NEC 500, NEC 505, CEC USA, Canada	**NEC 500, CEC:** ▪ Class I, Div. 1, Grp B, C, D T4	3050442, 3050442C		
		NEC 500: ▪ Class II/III, Div. 1, Grp E, F, G T4			
		NEC 505: ▪ Class I, Zone 1, AEx d, IIB+H2 T4 Gb			
		NEC 506: ▪ Zone 21, AEx tb, IIIC T135°C Db			
		CEC sect. 18: ▪ Class I, Zone 1, Ex db, IIB+H2 T4 Gb ▪ Zone 21, Ex tb IIIC T135°C Db			

Explosion protection – mining, mine gas and/or combustible dusts

Order coding	Certified according to	Classification	Certificate of unit approval	Operating and maintenance manual with declaration of conformity	Permissible ambient temperature
...-G 24 M2FP	ATEX EU	Ⓔx I M2 Ex db ib I Mb	IBExU13ATEX1087 X	B ATEX, B 25/2012 (EX03)	-20°C...+40°C
	IECEx International	Ex db ib I Mb	IECEx IBE 13.0045X		

Further information

HAWE Hydraulik SE is a responsible development partner with application expertise and experience in more than 70 areas of mechanical engineering and plant engineering. The product range includes hydraulic power packs, constant and variable pumps, valves, sensors and accessories. The modular system is complemented by electronic components that are perfectly coordinated with the hydraulic components and that simplify control, signal evaluation and fault detection. The intelligent system solutions reduce energy consumption and operating costs. Compact drives save space and permit innovative machine design.

Across the globe, approximately 2000 employees in 16 countries and sales partners in more than 40 countries provide customers with local, professional and personal support.
The company is certified in accordance with ISO 9001, ISO 4413, ISO 50001, OHSAS 18001.

■ HAWE subsidiaries and service repair shops **● HAWE sales partners**

- Germany
- Finland
- France
- Italy
- Austria
- Switzerland
- Slovenia
- Spain
- Sweden
- USA
- Canada
- Russia
- China
- India
- Japan
- Korea
- Singapore
- Australia

You can find further information on HAWE Hydraulik, your local contact and the range of hydraulics training sessions offered at: www.hawe.com.

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