

Environmental compatibility statement for EMC¹⁾, climate and mechanical load

RE 30030-U/04.16

1/12

Replaces: **12.11**

Control electronics for SY(H)DFE...

Control electronics
for pressure and flow control systems

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Tested products

This environmental compatibility statement applies for the following products:

- **External control electronics VT 5041-3X...**
- **Analog control electronics** mounted at the pilot valve (integrated)
- **Digital control electronics** mounted at the pilot valve (integrated)

For an overview of the tested products and their relation to pilot valves and pressure and flow control systems, please refer to the next page.

¹⁾ in the sense of the EMC directive 2004/108/EC

Related pilot valves and pressure and flow control systems

Tested product		Pilot valve		Pressure and flow control system	
Type	Data sheet	Type	Data sheet	Type	Data sheet
External control electronics VT 5041-3X...	30242	VT-DFP...2X	29016	SYDFE1-2X	30030
				SYDFE1-3X	30630
Analog control electronics mounted at the pilot valve (integrated)		VT-DFPE...2X	29016	SYDFEE-2X	30030
				SYDFEE-3X	30630
				SYHDFEE-1X	30035
Digital control electronics mounted at the pilot valve (integrated)		VT-DFPC...2X	29016	SYDFEC-2X	30030
				SYDFEC-3X	30630
				SYHDFEC-1X	30035
		VT-DFPn...2X	29016	SYDFEn-2X	30030
				SYDFEn-3X	30630
				SYHDFEn-1X	30035
		VT-DFPD...1X	29016	SYDFED-2X	30030
				SYDFED-3X	30630
				SYHDFED-1X	30035

External control electronics VT 5041-3X... for SYDFE1

1. EMC (electro-magnetic compatibility)

Test according to basic technical standard **EN 61000-6-2: 2005, VDE 0839 part 6-2**

			Interference resistance
EN 61000-4-2: 1995 +A1: 1998 +A2: 2000 IEC 1000-4-2	VDE 0847-4-2	ESD (electrostatic discharge)	Air discharge: Severity level 3 / evaluation criterion A Contact discharge: Severity level 4 / evaluation criterion A
EN 61000-4-4: 2004 IEC 1000-4-4	VDE 0847-4-4	BURST (transient interference)	Repetition rate 5 kHz Supply voltage: Severity level 3 / evaluation criterion A Data lines: Severity level 4 / evaluation criterion A Repetition rate 100 kHz Supply voltage: Severity level 3 / evaluation criterion A Data lines: Severity level 4 / evaluation criterion A
EN 61000-4-5: 2006 IEC 1000-4-5	VDE 0847-4-5	SURGE (surge voltages)	Supply voltage: Severity level 1 / evaluation criterion B
EN 61000-4-6: 2007 +Corrigendum August 2007 IEC 1000-4-6	VDE 0847-4-6	HF field, conducted	Severity level 3 / evaluation criterion A

Test according to basic technical standard **EN 61000-6-3:2007, VDE 0839 part 6-3**

		Interference emission
IEC/CISPR16-2-1: 2005-09 Point 7.4.1 IEC/CISPR16-1-2: 2006-08 Point 4.3	Emission DC voltage / supply voltage connection, conducted	Limit values according to EN 61000-6-3: 2007 0.15 to 30 MHz Table 1 / line 3

External control electronics VT 5041-3X... for SYDFE1 (continued)

2. Climate

Test according to EN 60068-2 / IEC 68-2 (environmental audit)

EN 60068-2-1: 2007	Cold test	2 cycles -5 °C duration 2 hours
EN 60068-2-2: 1993	Dry heating test	2 cycles +55 °C duration 2 hours
EN 60068-2-1: 2007 EN 60068-2-2: 1993	Storage temperature	-25 °C, duration 16 hours +85 °C, duration 16 hours
EN 60068-2-14: 1999	Temperature change	2 cycles -5 °C to +55 °C Duration 3 hours at min. / max. temperature
EN 60068-2-30: 2005	Humid heat, cyclic	Variant 2 +25 °C to +40 °C 93% to 97% relative humidity 2 cycles of 24 hours each

3. Mechanical load

Test according to EN 60068-2 / IEC 68-2 / DIN 40046 (environmental audit)

Three axes were tested (X/Y/Z)

EN 60068-2-6: 1995	Vibrations, sine-shaped	10 cycles (20 sweeps) 10 to 500 to 10 Hz with logarithmic frequency changing speed of 1 oct./min. Sweep: 10 to 57 Hz, amplitude 0.3 mm (p-p) 57 to 500 Hz, amplitude 2 g
IEC 68-2-36: 1973 DIN 40046-24: 1977	Vibrations, random (broadband noise)	20 to 500 Hz Amplitude 0.01 g ² / Hz (2.2 g RMS) Testing time 30 min per axis
EN 60068-2-27: 1993	Transport shock	Half-sine 15 g / 11 ms, 3 x in positive / 3 x in negative direction per axis

Integrated analog control electronics for SY(H)DFEE

1. EMC (electro-magnetic compatibility)

Test according to basic technical standard **EN 61000-6-2: 2001, VDE 0839 part 6-2**

			Interference resistance
EN 61000-4-2: 1995 +A1: 1998 +A2: 2000 IEC 1000-4-2	VDE 0847-4-2	ESD (electrostatic discharge)	Air discharge: Severity level 4 / evaluation criterion A Contact discharge: Severity level 4 / evaluation criterion A
prEN 61000-4-4: 2004 IEC 1000-4-4	VDE 0847-4-4	BURST (transient interference)	Repetition rate 5 kHz Supply voltage: Severity level 3 / evaluation criterion A Data lines: Severity level 4 / evaluation criterion A Repetition rate 100 kHz Supply voltage: Severity level 3 / evaluation criterion A Data lines: Severity level 4 / evaluation criterion A
EN 61000-4-5: 1995 +A1:2001 IEC 1000-4-5	VDE 0847-4-5	SURGE (surge voltages)	Supply voltage: Severity level 1 / evaluation criterion A
EN 61000-4-6: 1996 +A1: 2001 IEC 1000-4-6	VDE 0847-4-6	HF field, conducted	Severity level 3 / evaluation criterion A

Integrated analog control electronics for SY(H)DFEE (continued)

2. Climate

DIN IEC 68-2-1: 1976	Cold test	2 cycles +20 to –25 °C Duration 2 hours at min. temperature
DIN IEC 68-2-2: 1976	Dry heating test	2 cycles +20 to 70 °C Duration 2 hours at max. temperature
DIN IEC 68-2-1: 1976	Storage temperature Cold	–54 °C, duration 16 hours
DIN IEC 68-2-2: 1976	Storage temperature Dry heat	+85 °C, duration 16 hours
DIN IEC 68-2-14: 1986	Temperature change	2 cycles –25 to +70 °C Duration 3 hours each at min. / max. temperature
DIN IEC 68-2-30: 1985	Humid heat, cyclic	Variant 2 +25 °C to +55 °C 95% to 97% relative humidity 2 cycles of 24 hours each

3. Mechanical load

Three axes were tested (X/Y/Z)

EN 60068-2-6: 1994	Vibrations, sine-shaped	10 cycles 5 to 2000 to 5 Hz with logarithmic frequency changing speed of 1 octave/min. 5 to 57 Hz, amplitude 1.5 mm (p-p) 57 to 2000 Hz, amplitude 10g
IEC 68-2-36: 1973	Vibrations, random (broadband noise)	20 to 2000 Hz Amplitude 0.05 g ² / Hz (10 g RMS) Testing time 30 min per axis
EN 60068-2-27: 1993	Transport shock	Half-sine 15 g / 11 ms, 3 x in positive / 3 x in negative direction per axis

Integrated digital control electronics for SY(H)DFEC and SY(H)DFEn

1. EMC (electro-magnetic compatibility)

Test according to basic technical standard **EN 61000-6-2:2001, VDE 0839 part 6-2**

			Interference resistance
EN 61000-4-2: 1995 +A1: 1998 +A2: 2000 IEC 1000-4-2	VDE 0847-4-2	ESD (electrostatic discharge)	Air discharge: Severity level 4 / evaluation criterion A Contact discharge: Severity level 4 / evaluation criterion A
EN 61000-4-4: 1995 +A1: 2001 +A2: 2001 IEC 1000-4-4	VDE 0847-4-4	BURST (transient interference)	Supply voltage: Severity level 3 / evaluation criterion B Data lines: Severity level 4 / evaluation criterion B
EN 61000-4-5: 1995 +A1: 2001 IEC 1000-4-5	VDE 0847-4-5	SURGE (surge voltages)	Supply voltage: Severity level 1 / evaluation criterion A
EN 61000-4-6: 1996 +A1: 2001 IEC 1000-4-6	VDE 0847-4-6	HF field, conducted	Severity level 3 / evaluation criterion A

Test according to basic technical standard **EN 61000-6-3:2001, VDE 0839 part 6-3**

			Interference emission
EN 55022: 1998	VDE 0878-22	Emission Interference voltage	Class B / 0.15 to 30 MHz For use of the Rexroth power supply unit VT-NE32

Integrated digital control electronics for SY(H)DFEC and SY(H)DFEn (continued)

2. Climate

Test according to EN 60068-2 / IEC 68-2 (environmental audit)

EN 60068-2-1: 1994	Cold test	2 cycles –5 °C Duration 2 hours
EN 60068-2-2: 1993	Dry heating test	2 cycles +65 °C Duration 2 hours
EN 60068-2-1: 1994 EN 60068-2-2: 1993	Storage temperature	–25 °C, duration 16 hours +85 °C, duration 16 hours
EN 60068-2-14: 1986	Temperature change	2 cycles –5 °C to +65 °C Duration 3 hours at min. / max. temperature
EN 60068-2-30: 1985	Humid heat, cyclic	Variant 2 +25 °C to +55 °C 93% to 97% relative humidity 2 cycles of 24 hours each

3. Mechanical load

Test according to EN 60068-2 / IEC 68-2 / DIN 40046 (environmental audit)

Three axes were tested (X/Y/Z)

prEN 60068-2-6: 1994	Vibrations, sine-shaped	10 cycles 5 to 2000 to 5 Hz with logarithmic frequency changing speed of 1 octave/min. 5 to 57 Hz, amplitude 1.5 mm (p-p) 57 to 2000 Hz, amplitude 10g
IEC 68-2-36: 1973 DIN 40046-24: 1977	Vibrations, random (broadband noise)	20 to 2000 Hz Amplitude 0.05 g ² / Hz (10 g RMS) Testing time 30 min per axis
EN 60068-2-27: 1993	Shocking	Half-sine 15 g / 11 ms, 3 x in positive / 3 x in negative direction per axis
Extended testing according to MIL-STD-820 D	Vibrations, random	10 to 89 Hz, 0.04 g ² / Hz 89 to 300 Hz, +4 dB / octave 300 to 1000 Hz, 0.2 g ² / Hz 1000 to 2000 Hz, –6 dB / octave 60 min testing time per axis
	Shocking	Half-sine 60 g / 6 ms, 1 x in positive / 1 x in negative direction per axis

Integrated digital control electronics for SY(H)DFED

1. EMC (electro-magnetic compatibility)

Test according to harmonized basic technical standard **EN 61000-6-2: 2005** and **EN 61000-6-3: 2007 + A1/2011**

			Interference resistance
EN 61000-4-2: 2009	VDE 0847-4-2	ESD (electrostatic discharge)	Air discharge: Severity level 3 / evaluation criterion B Contact discharge: Severity level 2 / evaluation criterion B
EN 61000-4-4: 2004 + A1: 2010	VDE 0847-4-4	BURST (transient interference)	Repetition rate 5 kHz Supply voltage: Severity level 3 / evaluation criterion B E/A data line / overall line: Severity level 4 / evaluation criterion B Repetition rate 100 kHz Supply voltage: Severity level 3 / evaluation criterion B E/A data line / overall line: Severity level 4 / evaluation criterion B
EN 61000-4-5: 2006	VDE 0847-4-5	SURGE (surge voltages)	Supply voltage: Symmetric (line against line) Severity level 1 / evaluation criterion B Asymmetric (line against earth) Severity level 1 / evaluation criterion B
EN 61000-4-6: 2009	VDE 0847-4-6	HF fields (conducted)	Severity level 3 / evaluation criterion A (0.15 ... 80 MHz)

Test according to basic technical standard **EN 61000-6-3: 2007 + A1: 2011** and **EN 61000-6-4: 2007 + A1: 2011**

			Interference emission
EN 55016-2-1: 2009 + A1: 2011	CISPR 16-2-1: 2008 + A1: 2010 section 7	Emission Interference voltage (DC voltage / power supply connection)	Limit values according to EN 61000-6-3: 2007 + A1: 2011 Table 3 / section 3.1 DC mains connection 0.15...30 MHz Complies with class A, EN 55011

Integrated digital control electronics for SY(H)DFED (continued)

2. Climate

Test according to EN 60068-2 / IEC 68-2 (environmental audit)

EN 60068-2-1: 2007	Cold test	2 cycles -25 °C Duration 2 h
EN 60068-2-2: 2007	Dry heating test	2 cycles +70 °C Duration 2 hours
EN 60068-2-1: 2007 EN 60068-2-2: 2007	Storage temperature	-25 °C, duration 16 hours +85 °C, duration 16 hours
EN 60068-2-14: 2009	Temperature change	2 cycles -25 °C to +70 °C Duration 3 hours at min. / max. temperature
EN 60068-2-30: 2006	Humid heat, cyclic	+25 °C to +55 °C 95% relative humidity 2 cycles of 24 hours each

3. Mechanical load

Test according to EN 60068-2 / IEC 68-2 / DIN 40046 (environmental audit)

Three axes were tested (X/Y/Z)

DIN EN 60068-2-6: 2008-10	Vibrations, sine-shaped	10 cycles 10 to 2000 Hz with logarithmic frequency changing speed of 1 oct./min. Amplitude range: 10-57 Hz 1.5 mm p-p 57-2000 Hz 10 g
DIN EN 60068-2-64: 2009-04	Vibrations, random (broadband noise)	20-2000 Hz; eff. acceleration 10 g Power density range: 20 Hz 0.05 g ² / Hz 2000 Hz 0.05 g ² / Hz Testing time 30 min
DIN EN 60068-2-27: 2010-02	Transport shock	Half-sine 15 g / 11 ms, 3x each in pos. and neg. direction per axis

Note

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