

Technical Information

ModSTACK™ 6MS1600R17KE3-3WCH-C21MVTIOIN



Vorläufige Daten
preliminary data

Key data

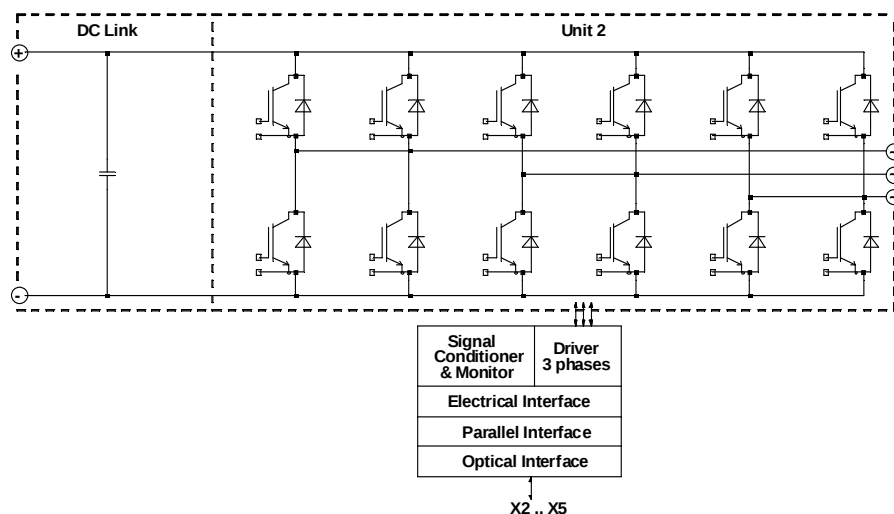
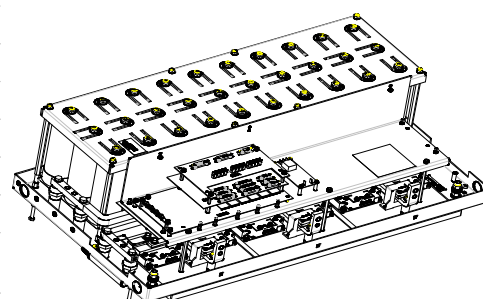
3x 975A rms at 789V rms, water cooled

General information

Stacks for various inverter application. Semiconductors, heat sinks, capacitors, drivers and sensors included. These are only technical data!

Please read carefully the complete documentation and maintain the proper design environment! Especially note the EMC environment and the controller's functionality.

Topology	DC Link + B6I	
Application / Modulation	Inverter / Sine	
Load type	resistive, inductive	
Cooling	water cooled	
Market	wind	
Implemented sensors	current, voltage, temperature	
Semicond. (Unit 1)	none	
DC Link	10.5mF	
Semicond. (Unit 2)	IGBT	6x FF800R17KE3
Driver signals IGBT	optical HFBR-15X1 / HFBR-25X1	
Standards	EN50178	
Sales - name	6MS16017E33W32779	
Internal ID	32779	
Mechanical drawing number	32779_MB	
Electrical drawing number	57000008	
Dimensions (width x depth x height)	1090 mm x 596 mm x 329 mm	
Weight	90 kg	



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Note

Heat sink with copper cooling channel.
Composites of fluid: Water and 52 vol. % Antifrogen N.

Electrical data

DC Link			min	typ	max	units
Voltage		V_{DC}		1150	1250	V
Overvoltage shutdown	within 150µs			1250		V

Unit 2 AC			min	typ	max	units
Voltage	depending on controller	V_{Unit2}		789		V_{RMS}
Continuous current	$V_{Unit2} = 789V_{RMS}$, $V_{DC} = 1150V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 15Hz$, $f_{sw2} = 1725Hz$, $\cos(\phi) = 1,00$	I_{Unit2}			975	A_{RMS}
Continuous current overload cap.	$T_{inlet} = 40^{\circ}C$, for overload capability 150% for 60s			666		A_{RMS}
Short time current	$T_{inlet} = 40^{\circ}C$, 10s, every 180s, initial load = 823 A_{RMS}	I_{Unit2}			1029	A_{RMS}
DC current	no rotating field, $T_{inlet} = 40^{\circ}C$	$I_{Unit2\ DC}$			488,0	A_{av}
Overcurrent shutdown	within 15µs			1700		A_{peak}
Switching frequency		f_{sw2}			5000	Hz
Power losses	$V_{Unit2} = 789V$, $V_{DC} = 1150V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 15Hz$, $f_{sw2} = 1725Hz$, $\cos(\phi) = 1,00$, $I_{Unit2} = 975A_{RMS}$	P_{loss2}		11400		W
Power factor		$\cos(\phi)_{Unit2}$	-1,00		1,00	

General data			min	typ	max	units
Power losses (PCB and capacitor)		$P_{loss\ aux}$			400	W
EMC test	according to IEC61800-3 at named interfaces	power	V_{Burst}	2		kV
		control	V_{Burst}	1		kV
		aux (24V)	V_{Surge}	1		kV
Insulation management is designed for		V_{Line}		690		V_{RMS}
Insulation test voltage	according to EN50178, $f = 50Hz$, $t = 60s$	V_{isol}		2,5		kV_{RMS}

Important component data			min	typ	max	units
DC Link capacitor		C_{DC}		10,50		mF
		type		Foil		
Temperature range			-25		+70	$^{\circ}C$
Rated voltage	per device	U_R		1500		V_{DC}
Rated capacitance	per device	C_R		350		μF
Capacitance tolerance	per device	Tol	-10		+10	%
Maximum ripple current	per device, $T_{amb} = 60^{\circ}C$	I_{Rmax}			60	A_{RMS}
wiring system	series, parallel			1s, 30p		
Balance or discharge resistors	per DC Link unit	R_b		6,0		k Ω

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Controller interface data

			min	typ	max	units
Auxiliary voltage		V_{aux}	18	24	30	V_{av}
Auxiliary power requirement	$V_{aux} = 24V_{av}$	P_{aux}	40			W
Driver and interface board	see separate technical information		TR110 / DR110			
Driver core			EiceDRIVER 2ED300C17-S			
Parallel interface board	see separate technical information		SAD101			
Digital input level	resistor to GND 1,8k Ω , capacitor to GND 4nF, high = on, min 15mA	V_{in}	0,0		15,0	V
Digital output level	open collector, low = ok, max 15mA	V_{out}	0,0		15,0	V
Analog current outputs Unit 2	load max 1mA; at 975A	$V_{ana\ out}$	4,86	4,96	5,06	V
Analog DC Link voltage output	load max 1mA; at 1250V	$V_{DC\ out}$	8,79	8,97	9,15	V
Analog temperature output	load max 1mA; at $T_{NTC} = 57^{\circ}\text{C}$ correspond to $T_j = 125^{\circ}\text{C}$	$V_{T\ out}$	8,82	9,00	9,18	V
Overttemperature shutdown	at $T_{NTC} = 60^{\circ}\text{C}$ correspond to $T_j = 135^{\circ}\text{C}$	$V_{T\ out\ OT}$		10		V
Optical interface board	see separate technical information		OEA101			
Optical input power				12		μW
Optical output power					60	μW

Heat sink water cooled / Thermal data

			min	typ	max	units
Water flow	according cooling water specification from infineon	$\Delta V / \Delta t_{Water}$	16			dm^3/min
Water pressure drop		Δp_{Water}		900		mbar
Water pressure					8	bar
Cooling water inlet temperature		T_{inlet}	-40		40	$^{\circ}\text{C}$
Water connection				3/4		in

IGBT data unit 2

			min	typ	max	units
Type	assumed					
collector-emitter saturation voltage	$I_c = 800\text{A}; V_{ge} = 15\text{V}; T_{vj} = 125^{\circ}\text{C}$	$V_{CE\ sat}$		2,4		V
parameter for linear model	$T_{vj} = 25^{\circ}\text{C}$	V_{ce1}		1,1		V
parameter for linear model	$T_{vj} = 25^{\circ}\text{C}$	r_{ce1}		1,125		m Ω
parameter for linear model	$T_{vj} = 125^{\circ}\text{C}$	V_{ce2}		1		V
parameter for linear model	$T_{vj} = 125^{\circ}\text{C}$	r_{ce2}		1,75		m Ω
turn-on / turn-off energy loss per pulse	$T_{vj} = 25^{\circ}\text{C}$	E_1		165 / 200		mJ
turn-on / turn-off energy loss per pulse	$T_{vj} = 125^{\circ}\text{C}$	E_2		240 / 295		mJ
thermal resistance, junction to case	per IGBT	R_{thjc}		0,028		K/W
thermal resistance, case to heatsink	per IGBT	R_{thch}		0,017		K/W

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Diode data unit 2

			min	typ	max	units
Type	assumed					
forward voltage	$I_F = 800A$; $V_{ge} = 0V$; $T_{vj} = 125^\circ C$	V_F		1,9		V
parameter for linear model	$T_{vj} = 25^\circ C$	V_{F1}		1,15		V
parameter for linear model	$T_{vj} = 25^\circ C$	r_{F1}		0,813		mΩ
parameter for linear model	$T_{vj} = 125^\circ C$	V_{F2}		1		V
parameter for linear model	$T_{vj} = 125^\circ C$	r_{F2}		1,125		mΩ
reverse recovery energy	$T_{vj} = 25^\circ C$	E_{rec1}		130		mJ
reverse recovery energy	$T_{vj} = 125^\circ C$	E_{rec2}		225		mJ
thermal resistance, junction to case	per Diode	R_{thjc}		0,064		K/W
thermal resistance, case to heatsink	per Diode	R_{thch}		0,039		K/W

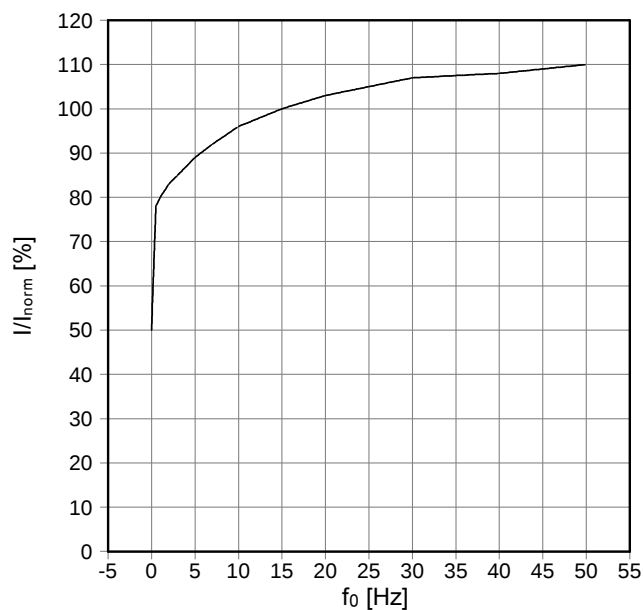
Environmental conditions

			min	typ	max	units
Storage temperature		T_{stor}	-40		65	°C
Ambient temperature	minimum 0°C for optional optical interface	T_{amb}	-25		55	°C
Operating temperature	see chapter Heat sink water cooled / Thermal data					
Cooling air velocity (PCB and capacitor)		$V_{Air PCB}$	2,0			m/s
Air pressure	standard atmosphere	p_{Air}	900		1100	hPa
Humidity	no condensation	Rel. F	0		95	%
Installation height			0		1000	m
Vibration	according to EN60068				10	m/s²
Continuous vibration	according to EN60068				20	m/s²
Shock	according to EN60068				100	m/s²
Protection degree				IP00		
Pollution degree				2		
Dimensions	width × depth × height		1090	596	329	mm
Weight with heat sink	approximation			90,0		kg

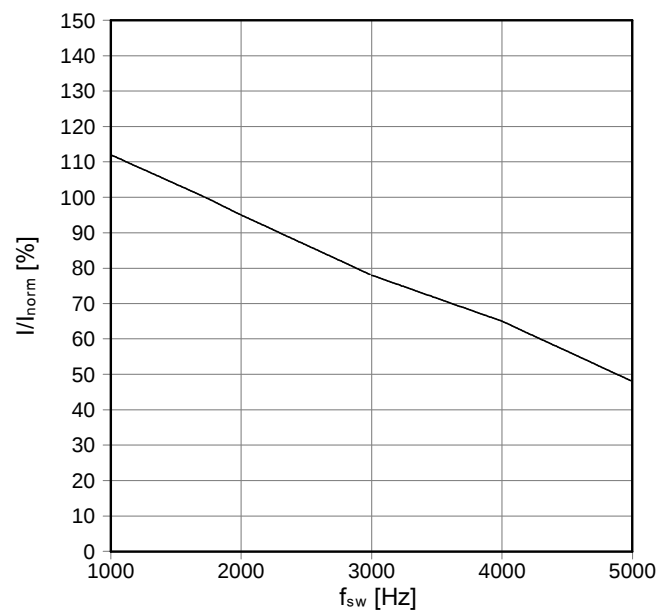
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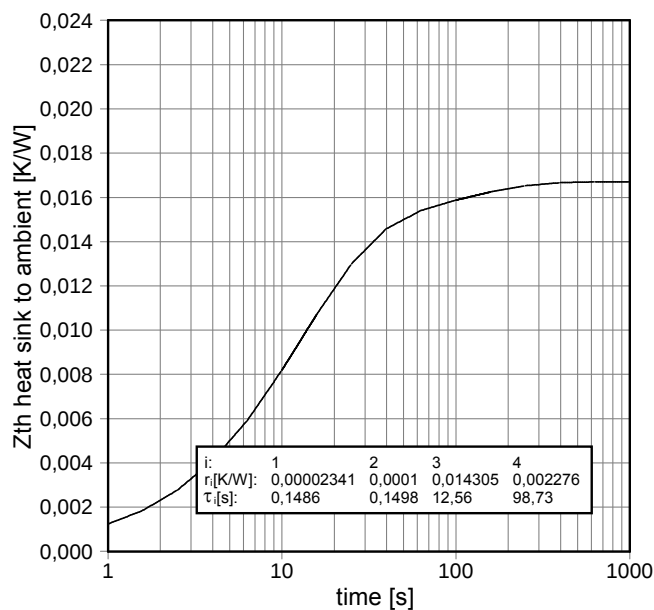
fo - derating curve IGBT (motor)
cos(phi) = 1
T_{cool medium} = 40°C



fsw - derating curve IGBT (motor)
cos(phi) = 1
T_{cool medium} = 40°C



Transient thermal impedance per module
T_{cool medium} = 40°C



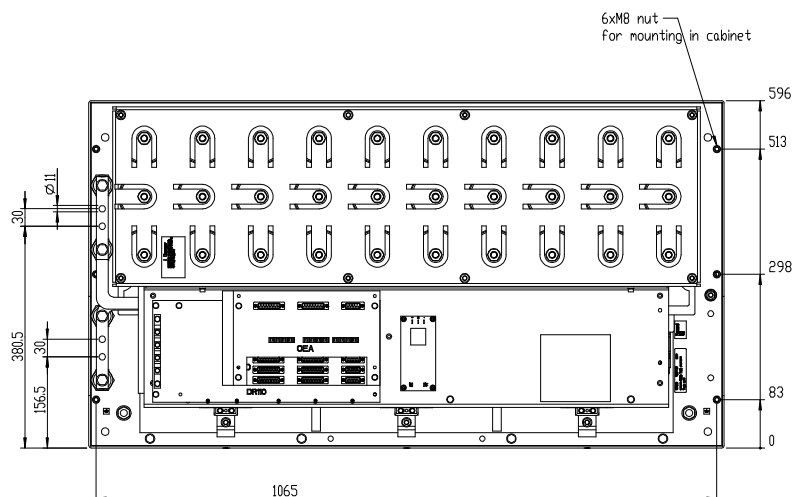
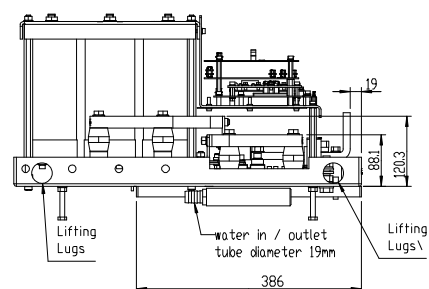
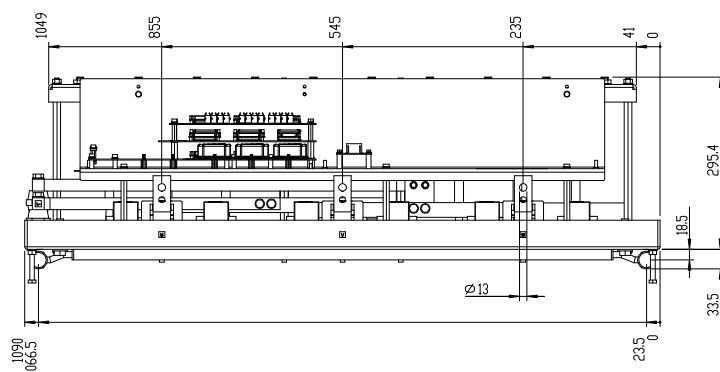
i:	1	2	3	4
r_i [K/W]:	0,00002341	0,0001	0,014305	0,002276
τ_i [s]:	0,1486	0,1498	12,56	98,73

Mechanical drawing

6MS....-3WCH-C21....

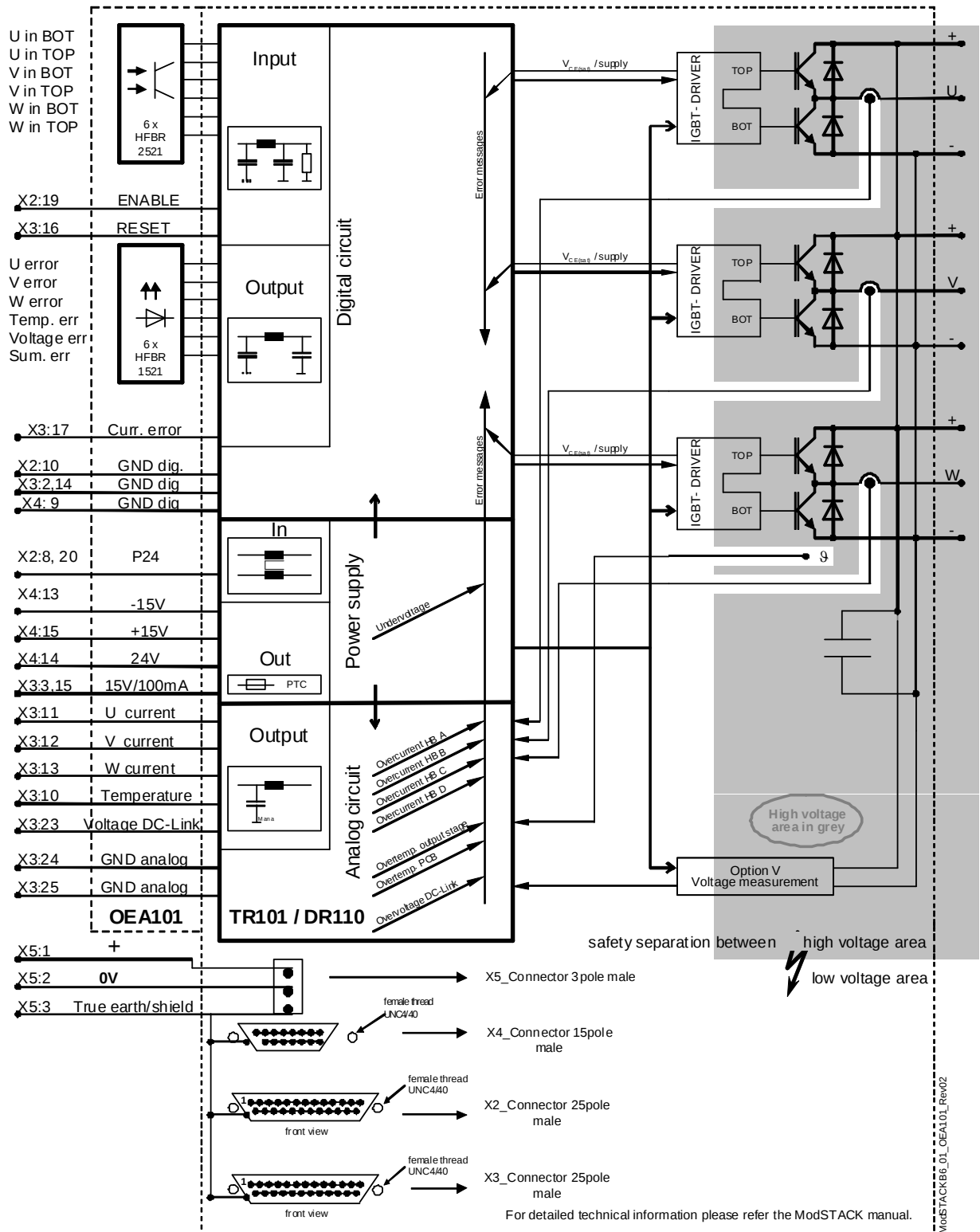
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32779 MB



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Circuit diagram



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- the conclusion of Quality Agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery depended on the realization of any such measures.

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Sicherheitshinweise

Bevor Sie mit der Installation und dem Betrieb der Baugruppe beginnen, lesen Sie bitte sorgfältig alle Sicherheitshinweise, Warnungen und beachten Sie die angebrachten Warnschilder. Vergewissern Sie sich, dass alle Warnschilder in leserlichem Zustand verbleiben und fehlende oder beschädigte Schilder ersetzt werden.

Safety Instructions

Prior to installation and operation, all safety notices and warnings and all warning signs attached to the equipment have to be carefully read. Make sure that all warning signs remain in a legible condition and that missing or damaged signs are replaced. To installation and operation, all safety notices and warnings and all warning signs attached to the equipment have to be carefully read. Make sure that all warning signs remain in a legible condition and that missing or damaged signs are replaced.

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