

TeSys H

Ultra-compact 22.5 mm motor starters

Flexible
Motor starters **M**
Smart Circuit breaker
Protection
Contactors
Thermal overload relays
Fuse switch-disconnectors
Reliable

TeSys LZ2H2X4BD
Schneider Electric
1.48 1.94
1.02 2.4
0.56 2.7
0.18
TeSys LZ2H2X4BD
24V-DC
TRIP/ERR
2
1
SET RESET
QR code

TeSys LZ2H2X4BD
Schneider Electric
1.48 1.94
1.02 2.4
0.56 2.7
0.18
TeSys LZ2H2X4BD
24V-DC
TRIP/ERR
2
1
SET RESET
QR code

Assembled motor starters

Fully integrated



Ultra-compact starters TeSys H

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The most compact 3 KW / 400 V starter in the world



Up to 75 % of space reduction

- Ultra-compact 22.5 mm starter
- Reversing starter in the same width
- Maximum space savings for group starter architecture

Long electrical durability

- Suitable for high demanding application
- 30 000 000 of AC53a electrical cycles

> With printed QR code, referring directly to the product data sheet.

Easy Design

- Wide range setting motor protection
- Automatic, manual or remote reset after thermal trip
- Wide range of control voltage

Easy to integrate

- Direct mounting installation on DIN rail
- Control terminals on the upper side
- Power terminal on the lower side

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Standard version

- 2 ratings:
 - 2.4 A 400 V AC53a
 - 6.5 A 400 V AC53a
- 2 control voltages:
 - 24 V DC
 - 110 V / 230 V AC
- 2 terminal types:
 - Screw clamps
 - Spring
- Can provide up to 3 functions:
 - Forward running
 - Reverse running
 - Overload protection



Safety version

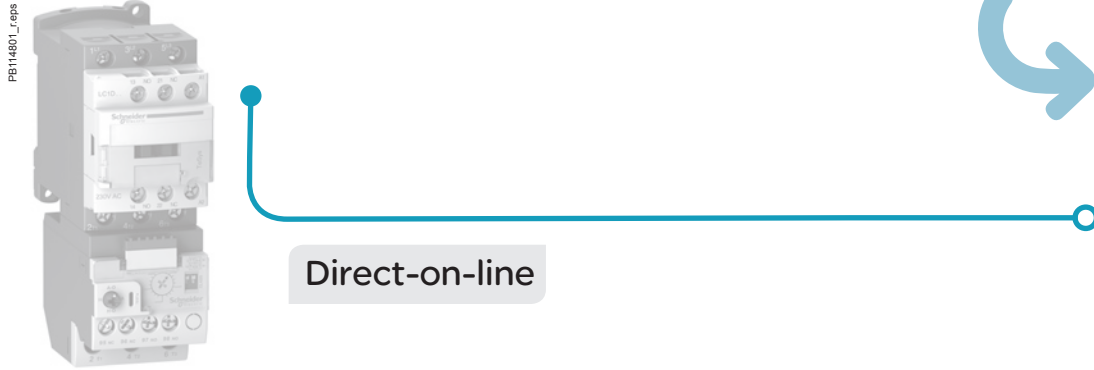
- Safe Torque Off embedded:
 - SIL3 according to IEC61508-1
 - Pl_e according to ISO13849-1
- ATEX:
 - As associated devices for motor protection



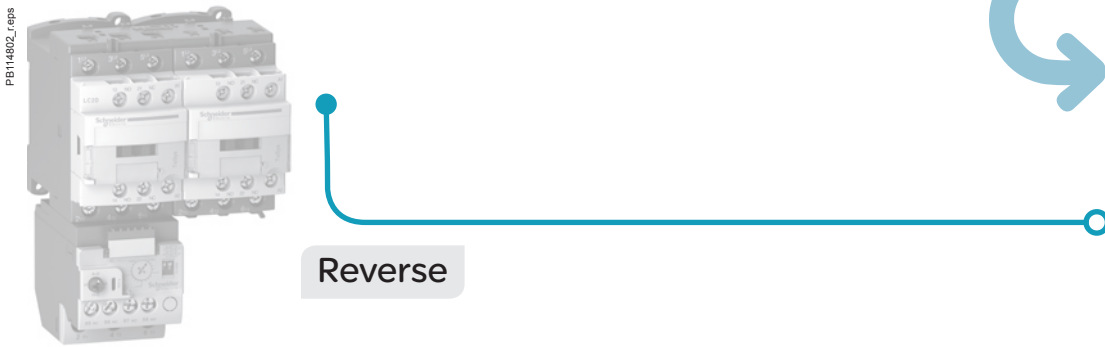
TeSys H is a solution dedicated to low footprint applications, in industries as food and beverage, logistics, and durable goods.



Conventional.....OR.....TeSys H standard solutions



Direct-on-line



Reverse

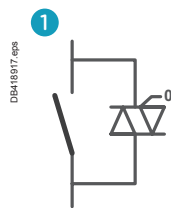
> How does the hybrid technology work ?

Hybrid technology:

Each contact is coupled with a power semiconductor for switching

> Higher number of on/off switches, extended durability.

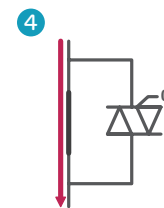
> Closing



Start: conduction through the semiconductor.

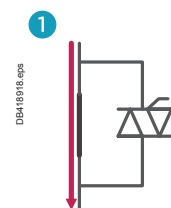


Contact closure under zero voltage. No electrical arc: the contact is preserved.



The semiconductor is non-conducting.

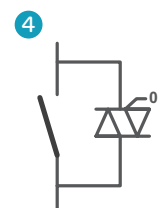
> Opening



Before the opening of the contact the semiconductor is triggered.



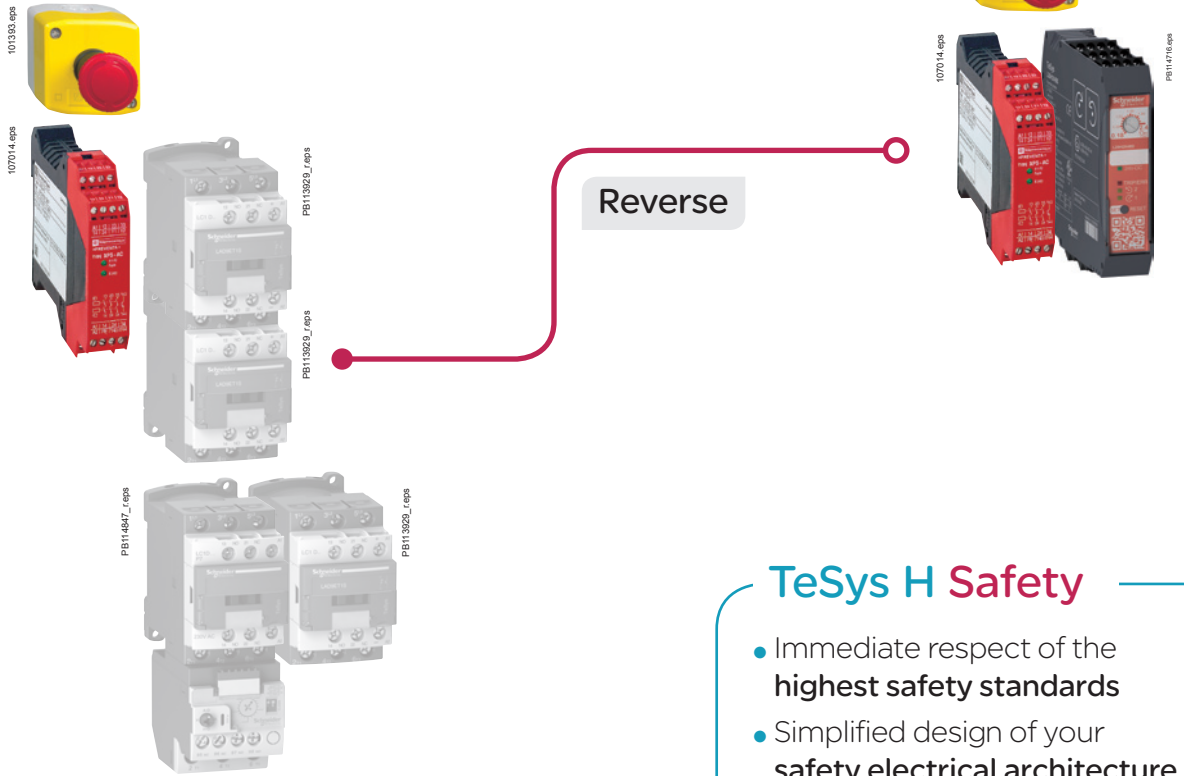
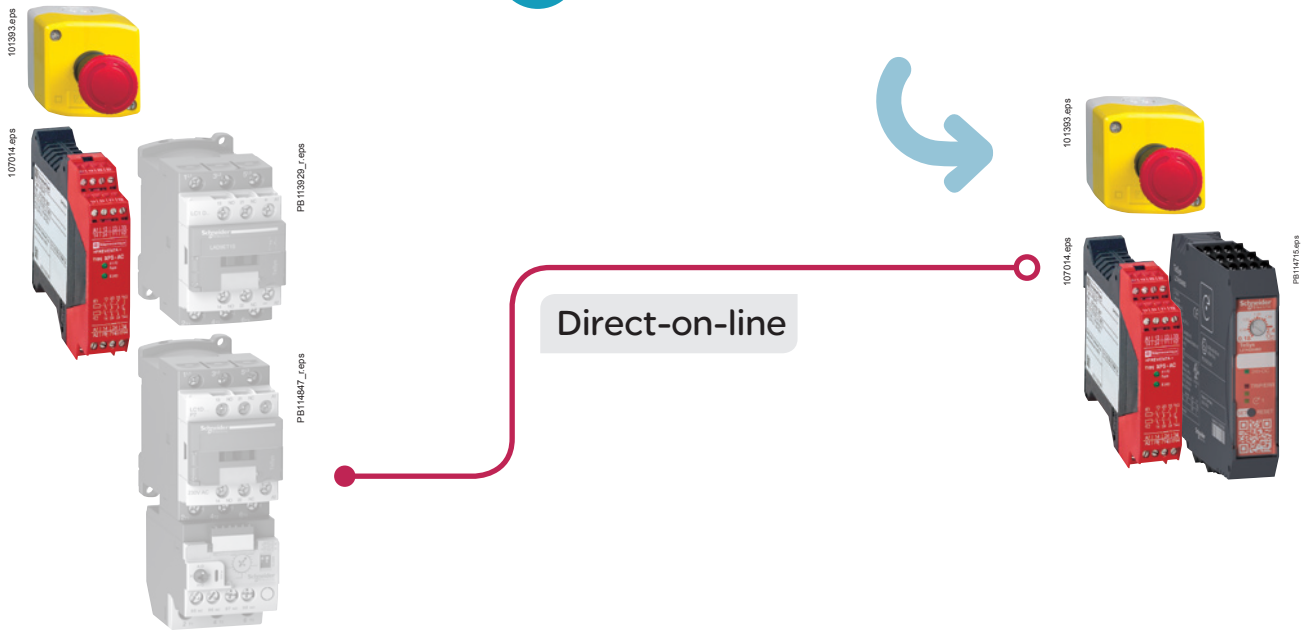
Contact opening: - no arc: the contact is preserved.



Stop: the semiconductor becomes non-conducting.

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Conventional OR TeSys H safety solutions



- TeSys H Safety**
- Immediate respect of the highest safety standards
 - Simplified design of your safety electrical architecture
 - Quicker panel implementation

Ultra-compact starters

TeSys H Standard

Safety - IEC ratings

Starters for asynchronous motors - AC53a utilization category:



LZ1H2X4BD

Standard starters TeSys H									
Starters	3- phases motor: max power (KW) for various voltage							Current range	Commercial references ⁽¹⁾
	220 V	230 V	380 V	400 V	415 V	440 V	500 V		
Direct-on-line									
Screw terminals	0.37	0.37	0.75	0.75	0.75	0.75	1.1	0.18...2.4	LZ1H2X4●●
	1.5	1.5	2.2	3	3	3	3	1.5...6.5	LZ1H6X5●●
Spring terminals	0.37	0.37	0.75	0.75	0.75	0.75	1.1	0.18...2.4	LZ1H2X43●●
	1.5	1.5	2.2	3	3	3	3	1.5...6.5	LZ1H6X53●●
Reverse									
Screw terminals	0.37	0.37	0.75	0.75	0.75	0.75	1.1	0.18...2.4	LZ2H2X4●●
	1.5	1.5	2.2	3	3	3	3	1.5...6.5	LZ2H6X5●●
Spring terminals	0.37	0.37	0.75	0.75	0.75	0.75	1.1	0.18...2.4	LZ2H2X43●●
	1.5	1.5	2.2	3	3	3	3	1.5...6.5	LZ2H6X53●●

(1) Replace the ●● in the reference by the bobine code: BD (24 V DC) or FU (110-230 V AC).



LZ7H2X4BD

Safety starters TeSys H									
Starters	3- phases motor: max power (KW) for different tensions							Current range	Commercial references ⁽¹⁾
	220 V	230 V	380 V	400 V	415 V	440 V	500 V		
Direct-on-line									
Screw terminals	0.37	0.37	0.75	0.75	0.75	0.75	1.1	0.18...2.4	LZ7H2X4●●
	1.5	1.5	2.2	3	3	3	3	1.5...6.5	LZ7H6X5●●
Spring terminals	0.37	0.37	0.75	0.75	0.75	0.75	1.1	0.18...2.4	LZ7H2X43●●
	1.5	1.5	2.2	3	3	3	3	1.5...6.5	LZ7H6X53●●
Reverse									
Screw terminals	0.37	0.37	0.75	0.75	0.75	0.75	1.1	0.18...2.4	LZ8H2X4●●
	1.5	1.5	2.2	3	3	3	3	1.5...6.5	LZ8H6X5●●
Spring terminals	0.37	0.37	0.75	0.75	0.75	0.75	1.1	0.18...2.4	LZ8H2X43●●
	1.5	1.5	2.2	3	3	3	3	1.5...6.5	LZ8H6X53●●

(1) Replace the ●● in the reference by the bobine code: BD (24 V DC) or FU (110-230 V AC).

Starters for resistive load – AC51 utilization category:

Starters	Resistive load current	Application	Commercial references ⁽¹⁾
	A		
Screw terminals	2.4	Standard	LZ1H2X4●●
		Safety	LZ7H2X4●●
	9	Standard	LZ1H6X5●●
		Safety	LZ7H6X5●●
Spring terminals	2.4	Standard	LZ1H2X43●●
		Safety	LZ7H2X43●●
	9	Standard	LZ1H6X53●●
		Safety	LZ7H6X53●●

(1) Replace the ●● in the reference by the bobine code: BD (24 V DC) or FU (110-230 V AC).

Ultra-compact starters

TeSys H Standard

Safety - UL ratings

Starters for asynchronous motors - AC53a utilization category:



LZ1H2X4BD

Standard starters TeSys H					
Starters	3- phases motor in HP			Current range A	Commercial references ⁽¹⁾
	208 V	220 V- 240 V	440 V- 480 V		
Direct-on-line					
Screw terminals	1/2	1/2	1	0.18...2.4	LZ1H2X4●●
	1	1.5	3	1.5...6.5	LZ1H6X5●●
Spring terminals	1/2	1/2	1	0.18...2.4	LZ1H2X43●●
	1	1.5	3	1.5...6.5	LZ1H6X53●●
Reverse					
Screw terminals	1/2	1/2	1	0.18...2.4	LZ2H2X4●●
	1	1.5	3	1.5...6.5	LZ2H6X5●●
Spring terminals	1/2	1/2	1	0.18...2.4	LZ2H2X43●●
	1	1.5	3	1.5...6.5	LZ2H6X53●●

⁽¹⁾ Replace the ●● in the reference by the bobine code: BD (24 V DC) or FU (110-230 V AC).



LZ8H2X4BD

Safety starters TeSys H					
Starters	3- phases motor in HP			Current range A	Commercial references ⁽¹⁾
	208 V	220 V- 240 V	440 V- 480 V		
Direct-on-line					
Screw terminals	1/2	1/2	1	0.18...2.4	LZ7H2X4●●
	1	1.5	3	1.5...6.5	LZ7H6X5●●
Spring terminals	1/2	1/2	1	0.18...2.4	LZ7H2X43●●
	1	1.5	3	1.5...6.5	LZ7H6X53●●
Reverse					
Screw terminals	1/2	1/2	1	0.18...2.4	LZ8H2X4●●
	1	1.5	3	1.5...6.5	LZ8H6X5●●
Spring terminals	1/2	1/2	1	0.18...2.4	LZ8H2X43●●
	1	1.5	3	1.5...6.5	LZ8H6X53●●

⁽¹⁾ Replace the ●● in the reference by the bobine code: BD (24 V DC) or FU (110-230 V AC).

Starters for resistive load – AC51 utilization category:

Starters	Resistive load current	Application	Commercial references ⁽¹⁾
	A		
Screw terminals	2.4	Standard	LZ1H2X4●●
		Safety	LZ7H2X4●●
	9	Standard	LZ1H6X5●●
		Safety	LZ7H6X5●●
Spring terminals	2.4	Standard	LZ1H2X43●●
		Safety	LZ7H2X43●●
	9	Standard	LZ1H6X53●●
		Safety	LZ7H6X53●●

⁽¹⁾ Replace the ●● in the reference by the bobine code: BD (24 V DC) or FU (110-230 V AC).

Ultra-compact starters

Circuit breaker selection for a group of starters



GV2L + LZ2H2X4BD

Magnetic motor circuit breakers:

- GV2L: rotary knob type - Ue = 500 V
- GV2LE: rocker lever type - Ue = 415 V.

Selection of the circuit breaker Type 1 coordination according to IEC/EN 60947-4-2

Max A	Iq kA	Number of TeSys H		Reference Circuit breaker	
		2.4 A	6.5 A	Rotary	Rocker
0.4	50.0	1	1	GV2L03	GV2LE03
0.63	50.0	1	1	GV2L04	GV2LE04
1	50.0	1	1	GV2L05	GV2LE05
1.6	50.0	1	1	GV2L06	GV2LE06
2.5	35.0	1	1	GV2L07	GV2LE07
4	12.5	1	1	GV2L08	GV2LE08
6.3	8.0	2	1	GV2L10	GV2LE10
10	7.0	4	1	GV2L14	GV2LE14
14	5.0	5	2	GV2L16	GV2LE16
18	4.0	7	2	GV2L20	GV2LE20
25	4.0	10	3	GV2L22	GV2LE22
32	3.0	13	4	GV2L32	GV2LE32

Technical Data for Designers

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TeSys H – Ultra-compact motor starters

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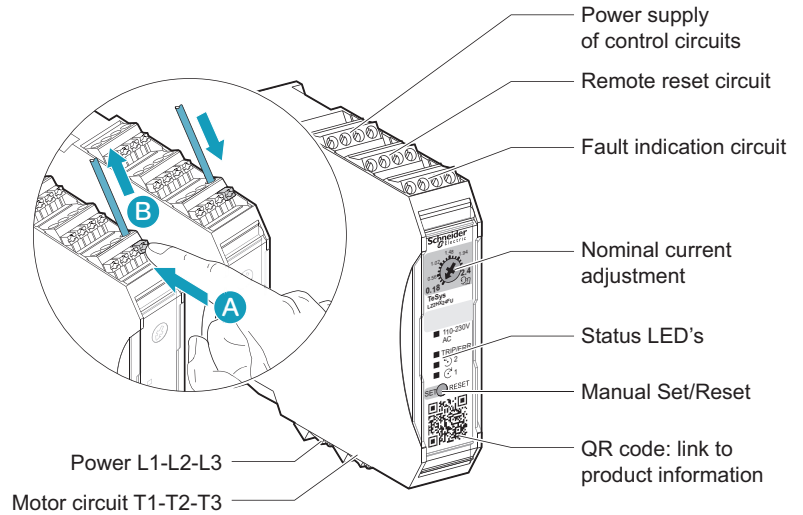
Ultra-compact starters

TeSys H

Identification of terminals / Indicators / Setting means and procedure

Setting procedure

DB418503.eps



STEP	ACTION
1	Lift the cover on the front of the TeSys H motor starter to access the SET/RESET button.
2	Press and hold down the SET/RESET button for at least 6 seconds. After 6 seconds the 110-230 V AC or 24 V DC LED flashes once.
3	After the LED has flashed once, release the SET/RESET button.
4	Turn the potentiometer to select a nominal current, and then fine-tune the position until the LEDs indicate the exact nominal current.
5	Press the SET/RESET button to save the selected nominal current. The 110-230 V AC or 24 V DC LED comes on and the other LEDs go off.
6	Drop the cover back over the front of the TeSys H motor starter.

Protection functions

The protection of three - phase motors is ensured against potential faults

- Thermal overload: the motor currents exceed the set value.
- Phase unbalanced: the motor currents differ from each other by more than 33 %
- Phase loss: power missing on one or several phases
- Stall and jam: motor current exceeding 45 A for more that 2 s during starting or running phase - No motor is connected - Motor current is lower that the minimum configurable current for more than 2 seconds, on at least two phases.

For all this detected situations, the TeSys H motor starter will switch off, activate its TRP/ERR LED and fault signaling contact.

Please refer to the "Instruction sheet and User Guide" for more information.

Ultra-compact starters

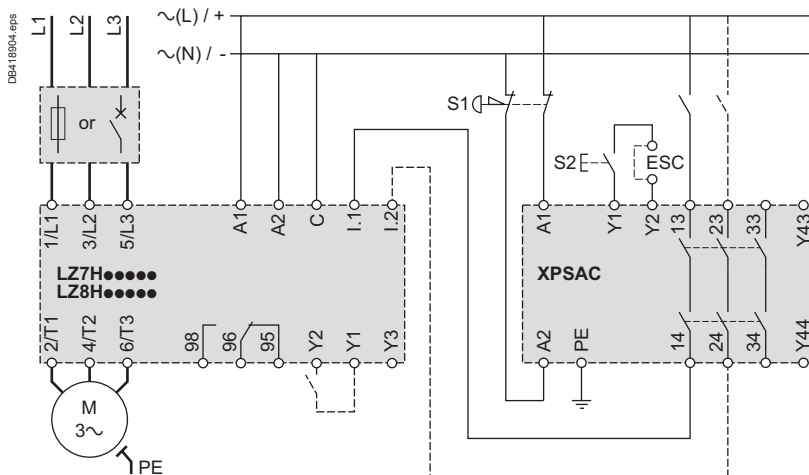
TeSys H

Electrical diagrams for Safety chain applications

Preferred

Electrical life time: 30000000 AC53a electrical cycles

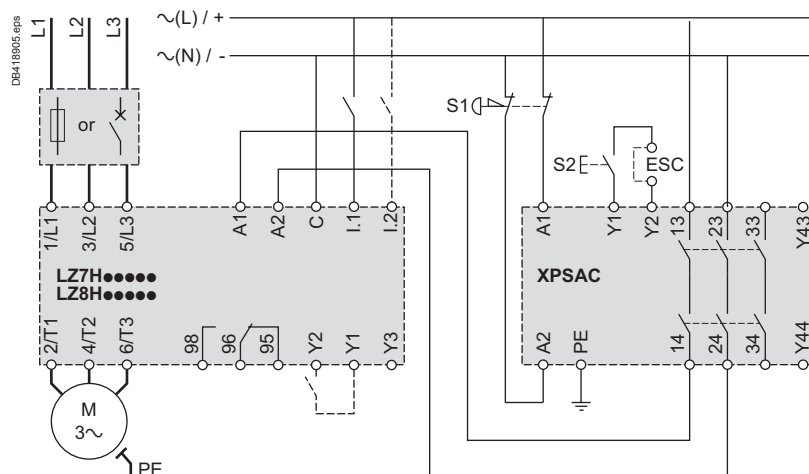
Safety Chain Application for Monitoring Emergency STOP Circuits with Two Channel Inputs and Two Channel Outputs with Preventa XPSAF Safety Processing Device.



Possible but non- recommended

Electrical life time: 10000 AC53 a electrical cycles

Safety Chain Application for Monitoring Emergency Stop Circuits with Two Channel Inputs and Two Channel Outputs with Preventa XPSAC Safety Processing Device.



Environment			
Rated insulation voltage (Ui)	Conforming to IEC/EN 60947-1, overvoltage category III, degree of pollution: 2	V	500
Rated impulse withstand voltage (Uimp)	Conforming to IEC/EN 60947-4-2	kV	6 (24 V DC control voltage); 4 (110 V - 230 V AC control voltage)
Conforming to standards			IEC / EN 60947-4-2
Product certifications			CE, CUL, ATEX (for failsafe product), CCC (on going)
Degree of protection	Conforming to IEC / EN 60947-1		IP20
Environment category	Conforming to IEC / EN 60947-1		E
Protective treatment	Conforming to IEC/EN 60068-2-30		"TC"
Ambient air temperature around the device	Storage	°C	-40...+80
	Operation (see derating curves)	°C	-25...+70
Maximum operating altitude	without derating	m	2000
	with derating	m	No
Operating positions (see derating curves)	Vertical axis (horizontal DIN rail)		Yes
	Horizontal axis (vertical DIN rail)		Not authorised
Shock resistance 1/2 sine wave = 18 ms	Conforming to IEC/EN 60068-2-27	gn	30 Starter OFF
		gn	30 Starter ON
Vibration resistance 10...150 Hz	Conforming to IEC/EN 60068-2-6	gn	5 Starter OFF
		gn	5 Starter ON
Resistance to electrostatic discharge	Conforming to IEC/EN 61000-4-2	kV	Air discharge: 8 kV
		kV	Contact discharge: 6 kV
Immunity to radiated high-frequency disturbance	Conforming to IEC/EN 61000-4-3		
		V/m	20
		V/m	10
Immunity to fast transient currents	Conforming to IEC/EN 61000-4-4	kV	3
Immunity to conducted high frequency disturbances	Conforming to IEC/EN 61000-4-6	V	10
Radiated emission and conducted	Conforming to CISPR 11 and EN 55011		Class A
Surge	Conforming to IEC/EN 61000-4-5	kV	1 symmetrical
		kV	2 asymmetrical

Control circuit characteristics			
Rated voltage	~ 50/60 Hz	V	110 - 230
	---	V	24
Voltage limits	~ 50/60 Hz	V	85...253
	---	V	19.2...30
Voltage dips		ms	3
Short time interruptions		ms	3

Power circuit characteristics				
			LZ●2X4●●	LZ●6X5●●
Power dissipation for corresponding Rated Operating Current (see derating curve)		W	0.88 ... 4.1	0.88 ... 7
Rated Operating Current	AC51 conforming to IEC/EN 60947-4-3	A	0.18 - 2.4	1.5 - 9
	AC53a conforming to IEC/EN 60947-4-2	A	0.18 - 2.4	1.5 - 6.5
Electrical life	AC51	Op	30 000 000 ⁽¹⁾	
		Op	10 000 ⁽²⁾	
	AC53A	Op	30 000 000 ⁽¹⁾	
		Op	10 000 ⁽²⁾	
Maximum Operating rate	AC51	Op/h	7200	
	AC53A		See curves	
Time to restart after overload trip	Manual or remote mode	mn	2	
	Automatic	mn	20	

Power and control terminal Characteristics				
		Terminal type	Screw M3	Push in
Flexible cable without cable end	1 conductor	mm ²	0.25...2.5	0.25...2.5
	2 conductors	mm ²	0.25...0.75	
Flexible cable with cable end	1 conductor	mm ²	0.25...2.5	0.25...2.5
	2 conductors	mm ²	0.25...1.5	0.25...1.5
Solid cable without cable end	1 conductor	mm ²	0.25...2.5	0.25...2.5
	2 conductors	mm ²	0.25...0.75	
Screwdriver		mm	flat screwdriver: 3 mm	
Tightening torque		N.m	0.5..0.6	

(1) With ON/OFF control through control inputs (I₁, I₂ terminals).

(2) With ON/OFF control through power supply (A₁, A₂ terminals).

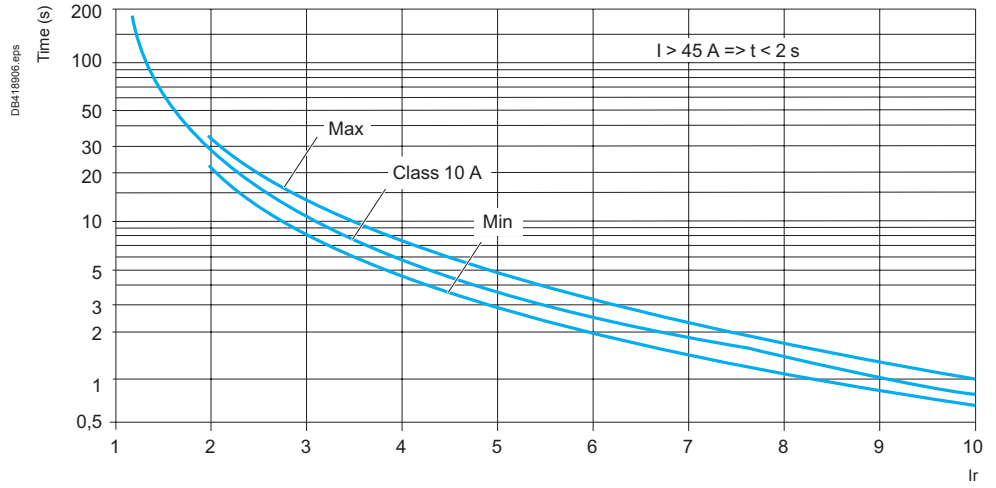
Ultra-compact starters

TeSys H

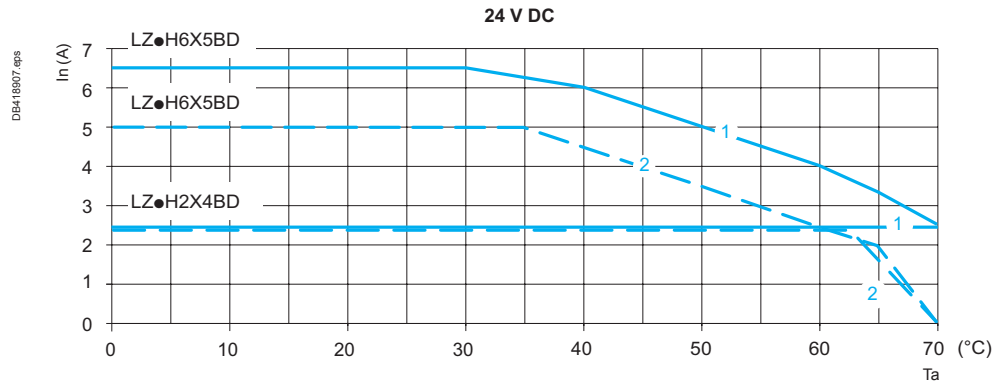
System conditons			
Database for failure rates		SN 29500	
System type		Type B	
Standard used		IEC 61508	
Beta factor		1 %	
Mean time to failure (MTTF) at an ambient temperature 40 °C		39.3 (LZ7H or LZ8H 24 V DC) 39.1 (LZ7H or LZ8H 110/230 V AC)	
Safe torque-off			
		LZ7H or LZ8H 24 V DC	LZ7H or LZ8H 110/230 V AC
Ambient temperature	°C	40	40
Mean time to failure (MTTF)		517	289
Switch-off time		8°	100
λ_{sd} [FIT] safe, detectable		664	638
λ_{su} [FIT] safe, undetectable		968	935
λ_{dd} [FIT] dangerous, detectable		218	388
λ_{du} [FIT] dangerous, undetectable		2.67	6.82
SFF [%] Safe failure fraction		99	99
DCS [%] Diagnostic coverage safe		40.7	40.6
DC [%] Diagnosctic coverage		98	98
PFH Probability of dangerous failure per hour		2.67×10^{-9}	6.82×10^{-9}
Safety level		IEC/CEI 61508-1: SIL 3 ISO 13849-1: Category 3 PL e EN 60954-1: Category 3	
Motor overload protection			
		LZ7H or LZ8H 24 V DC	LZ7H or LZ8H 110/230 V AC
Ambient temperature	°C	40	40
Mean time to failure (MTTF)		447	273
Time to trip		As for Class 10 A, IEC/CEI 60947-4-2	
λ_{sd} [FIT] safe, detectable		637	636
λ_{su} [FIT] safe, undetectable		870	841
λ_{dd} [FIT] dangerous, detectable		239	402
λ_{du} [FIT] dangerous, undetectable		17	17
SFF [%] Safe failure fraction		99	99
DCS [%] Diagnostic coverage safe		42.3	43.1
DC [%] Diagnosctic coverage		93	95
Safety level		IEC/CEI 61508-1: SIL 2	

Ultra-compact starters TeSys H

Overload protection tripping curve at 20 °C

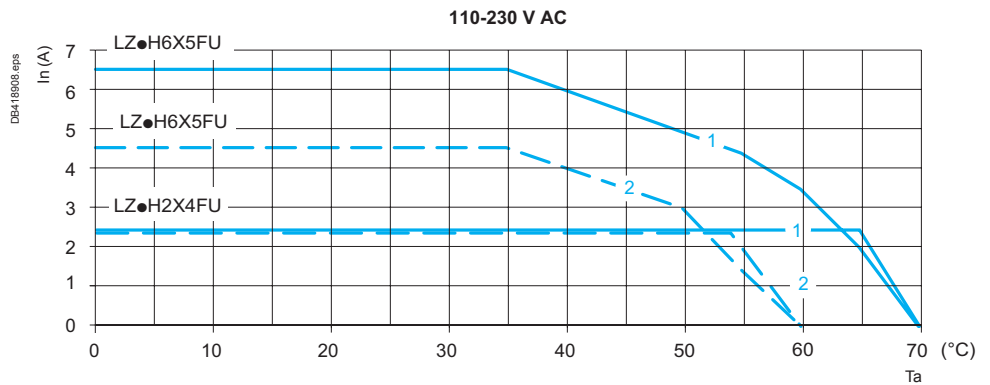


Derating curves: maximum load current (In)



Derating according:

- motor starter control power supply
- ambient temperature (Ta)
- distance between devices **1**: 20 mm, with spacing
2: without spacing.



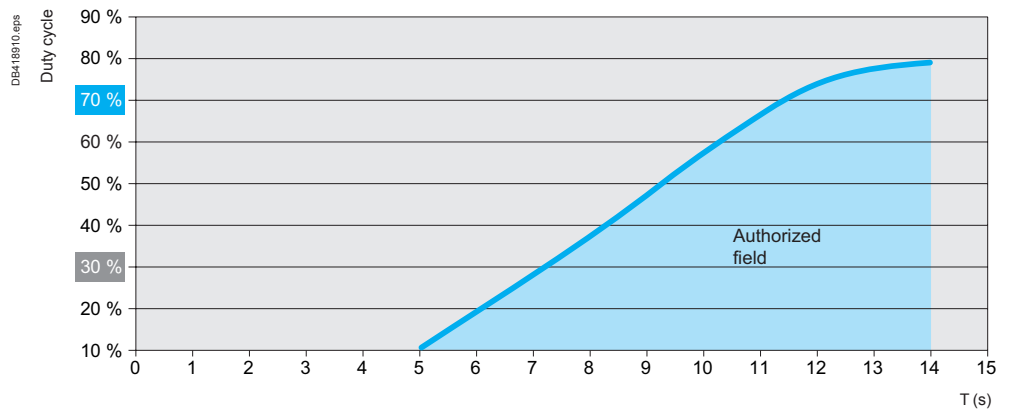
Ultra-compact starters

TeSys H

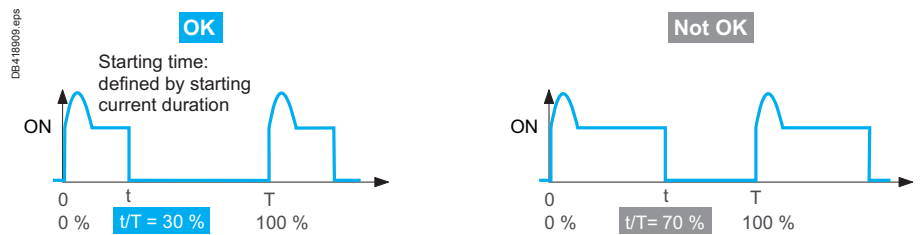
Minimum duty cycle t/T (%) versus cycle duration T (s)

Due to the effect of the peak current on the TeSys H monitoring circuit during the starting time, a stop/start sequence should not occur before a certain amount of time. The diagrams below show the minimum duty cycle according to the total period for 2 typical starting time values.

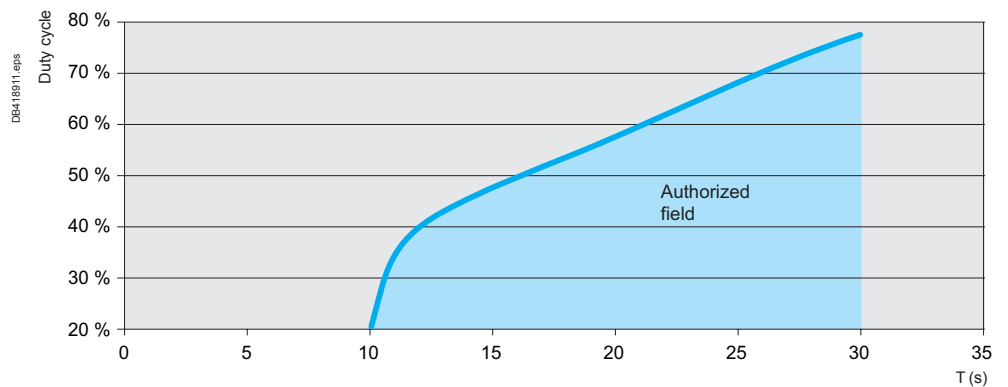
With a starting time = 100 ms



Example: for starting time = 100 ms

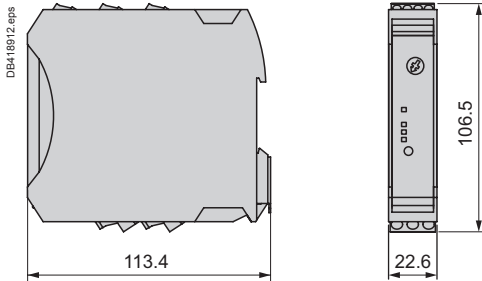


With a starting time = 150 ms

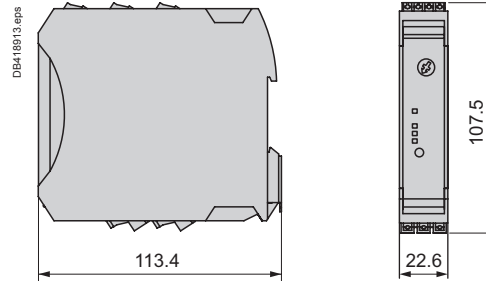


Dimensions mm

LZ●H●●●●●

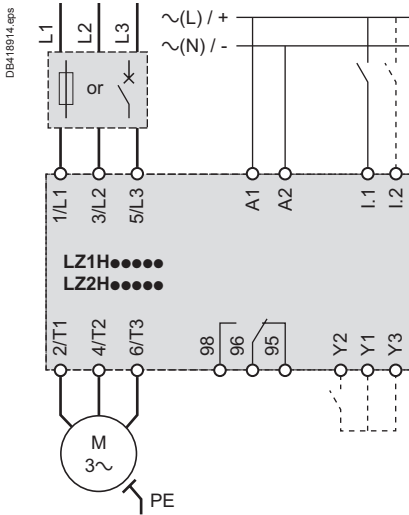


LZ●H●●●3●●

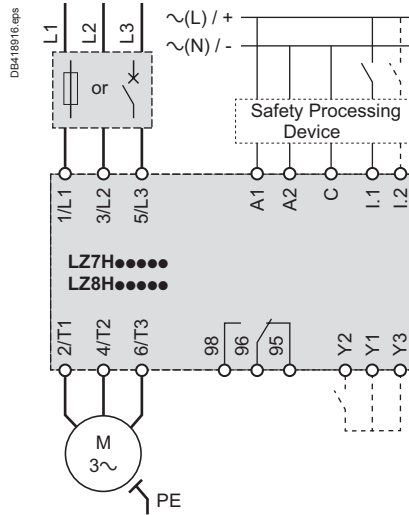


Wiring diagrams

Motor control by standard starter



Motor control by safety starter



Power terminals

T1, T2, T3 Motor connection
L1, L2, L3 Power inputs

Control terminals

A1, A2 Auxiliary power unit
I.1 Control input, direction 1
I.2 Control input, direction 2
(LZ2H and LZ8H only)
C Control inputs common point
(LZ7H and LZ8H only)
Y1 Reset mode, common point
Y2 Reset mode, remote, manual
Y3 Reset mode, automatic
98, 96, 95 Trip or error signaling contact

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