

Insulation monitoring device (IMD) IM-05DCCT.E / IM-05DCCT.ED for electric vehicles, charging stations and DC drives



Monitored circuit

AC Voltage range	0...690V
DC Voltage range	0...1500V
Frequency range	DC, 10...500Hz

Auxiliary supply voltage

DC supply voltage	10..36V
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Monitoring functions

Insulation resistance between HV circuit and earth

Connection of the earth wires

System voltage level

Self-test

Disconnection functionality of HV connectors (only at IM-05DCCT.ED)

Control method of the disconnection switches	CAN bus command
Maximum continuous working insulation voltage (disconnection switches open)	1500V (leakage current 1uA @ +25°C)
Maximum working insulation voltage (disconnection switches open) (1min)	2600V (leakage current 1mA @ +85°C)
Maximum working insulation voltage (10/1000us impulse)	10000V

Outputs

Status output	High side (external pull-down resistor required) High = system ok, insulation resistance above alarm level Low = alarm situation (insulation resistance below alarm level, system fault, earth wire disconnected, system undervoltage or supply voltage disconnected)
PWM output	Low side (external pull-up resistor required) High side (external pull-down resistor required) Indication of the measured insulation resistance and possible fault conditions
CAN bus interface	

Outputs are short circuit proof and galvanically isolated from the HV side



Alarm parameters (set at factory or with the CAN bus interface)

Insulation resistance response value R_{an}	50k Ω ...1M Ω
Insulation resistance response value hysteresis	25 %
Undervoltage detection threshold	OFF / 20, 50...500V
Averaging factor	1...10

Measuring specifications

Measuring range	0k Ω ...10M Ω
Relative uncertainty	$\pm 20k\Omega$ @ 0...50 k Ω $\pm 15\%$ @ 50k Ω ... 2M Ω $\pm 25\%$ @ 2M Ω ...10M Ω
Measuring voltage U_M	$\pm 25V$
Measuring current I_M at $R_F = 0$	50 μA
Impedance Z_i at 50 Hz	$\geq 500k\Omega$
Internal DC resistance R_i	$\geq 500k\Omega$
System leakage capacitance C_e (nominal measurement specifications)	$\leq 1\mu F$
Response time t_{an} ($R_F = 10 M\Omega$ to $R_{an}/2$; at $C_e < 1 \mu F$)	5s

Other details

Operating temperature	-40...+85 $^{\circ}C$
Mounting	M4 metal screws
Maximum dimensions - Height	25mm
Maximum dimensions - Width	60mm
Maximum dimensions - Length	140mm
Weight	100g

Standards

Measurements	IEC 61557-8:2014 (requires alarm indicator and test button implemented at the customer's installation)
Safety	IEC 61010-1:2010 (3rd Edition), IEC 60664-1
EMC	IEC 61326-2-4, ISO 10605



Electrically propelled road vehicles - Safety specifications	ISO 6469-3:2021
Road vehicles — Environmental conditions and testing for electrical and electronic equipment	ISO 16750-1, ISO 16750-2, ISO 16750-3
Environmental tests	IEC 60068-2-14, IEC 60068-2-27, IEC 60068-2-30, IEC 60068-2-38, IEC 60068-2-64

Connectors

A	PCB connector type	TE Connectivity Micro MATE-N-LOK 2-1445088-8
	Crimp contacts	8 x TE Connectivity Micro MATE-N-LOK 1-794606-1
	Housing for crimp contacts	TE Connectivity Micro MATE-N-LOK 1445022-8
	Pin 1	Chassis ground / electronic ground
	Pin 2	Supply voltage
	Pin 3	Chassis ground
	Pin 4	Chassis ground (must be separate wire)
	Pin 5	PWM output (high side)
	Pin 6	PWM output (low side)
	Pin 7	not connected
B	PCB connector type	TE Connectivity Micro MATE-N-LOK 2-1445088-2
	Crimp contacts	2 x TE Connectivity Micro MATE-N-LOK 1-794606-1
	Housing for crimp contacts	TE Connectivity Micro MATE-N-LOK 1445022-2
	Pin 1	HV line +
C	PCB connector type	TE Connectivity Micro MATE-N-LOK 2-1445088-2
	Crimp contacts	2 x TE Connectivity Micro MATE-N-LOK 1-794606-1
D	Housing for crimp contacts	TE Connectivity Micro MATE-N-LOK 1445022-2
	Pin 1	HV line -
	Pin 2	HV line -
	PCB connector type	TE Connectivity Micro MATE-N-LOK 2-1445088-2
D	Crimp contacts	2 x TE Connectivity Micro MATE-N-LOK 1-794606-1
	Housing for crimp contacts	TE Connectivity Micro MATE-N-LOK 1445022-2
	Pin 1	CAN_L
	Pin 2	CAN_H





