

## IVT 3

### COMPACT CURRENT SENSING

*ISAscale® compact high precision current measurement device*

#### INTRODUCTION

The IVT 3 is a compact high precision current measurement device, which is built on a platform concept where functional components can be added to adapt to many different use cases. The Pro version supports insulation resistance monitoring and 3 or 6 voltage measurement channels. The IVT 3 series is developed according to ISO 26262:2018 (Road vehicles – Functional safety).

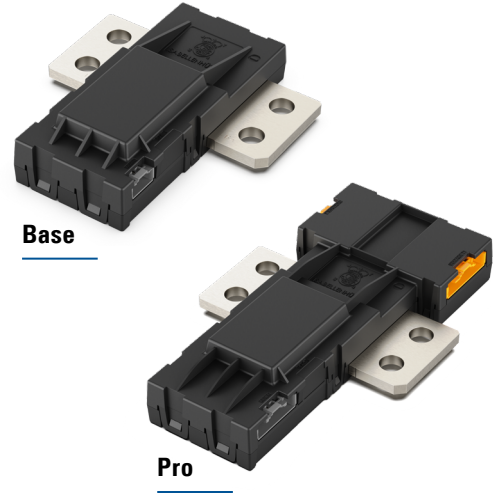
#### APPLICATIONS

- Hybrid and battery electric vehicles
- Stationary energy storage systems
- Battery based applications
- Fuel cells
- Industrial applications
- Uninterruptable power supply (UPS) systems

#### FEATURES

- Shunt based current measurement (ASIL C)
- 3 or 6 voltage measurement channels (ASIL B)
- Active insulation monitoring (QM)
- Temperature measurement
- Nominal current measurement range:  $\pm 1,000$  A
- Extended measurement range:  $\pm 4,000$  A
- Total accuracy over lifetime  $\pm(0.4\% \text{ of rdg.} + 0.1 \text{ A})^*$  (over whole temperature range  $-40^\circ\text{C}$  up to  $125^\circ\text{C}$ )
- Isolation according to ISO 60664 (1,000 V basic isolation)
- CAN 2.0 a/b with DBC
- Diagnosis via UDS
- Supply voltage 12/24 V

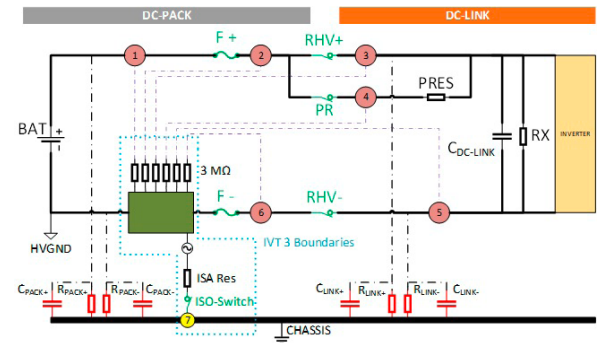
\*rdg. = reading; measured value



	IVT 3 Base	IVT 3 Pro
Current Measurement (ASIL C)	✓	✓
Voltage Measurement 6 channels (ASIL B)	—	✓
Insulation monitoring (QM)	—	✓
Temp. Measurement	✓	✓
Diagnosis via UDS	✓	✓
AUTOSAR 4.0.3	✓	✓
CAN 2.0 B	✓	✓
CAN Termination	optional	optional
Sleep mode	optional	optional
Supply Voltage 24 V	development by request	✓

INSTALLATION

The following graphic shows the connection scheme of the IVT 3 Pro. For the voltage channels in IVT 3 Pro, the measurement points **1, 3, 5** must be connected as shown in the picture, to ensure that there is no disturbance of the insulation monitoring. Moving **2, 4, 6** to other positions is possible, but not recommended. Due to the fact that changing positions could result in deviation of insulation monitoring. The IVT 3 Pro can also be placed in the plus path of the battery. In this case, the rules for the voltage measurement points remain the same, however the position of the sensor and **1** are inverted. Insulation monitoring can be switched on and off via CAN. ISO 26262:2018 (Road vehicles – Functional safety).



TECHNICAL DATA CURRENT

Description	Value			Unit
Measurement range	nominal: $\pm 1,000$	overcurrent: $\pm 1,500$	extended: $\pm 4,000$	A
Resolution	2			mA
Initial accuracy	$\pm (0.1 \% \text{ of rdg.}^* + 0.05)$			A
Total accuracy	$\pm (0.4 \% \text{ of rdg.}^* + 0.1)$	$\pm (0.4 \% \text{ of rdg.}^* + 0.1)$	$\pm (1.0 \% \text{ of rdg.}^* + 0.1)$	A
Linearity	$\pm 0.01$			% of rng.**
Noise	$\leq 70$			mA (RMS)

TECHNICAL DATA VOLTAGE

Description	Value		Unit
Measurement range	nominal: $\pm 1,000$	extended: $\pm 1,250$	V
Resolution	$< 40$		mV
Initial accuracy	$\pm (0.1 \% \text{ of rdg.}^* + 0.1)$		V
Total accuracy	$\pm (0.4 \% \text{ of rdg.}^* + 0.1)$	$\pm (5 \% \text{ of rdg.}^* + 0.1)$	V
Linearity	$\pm 0.01$		% of rng.**
Noise	$\leq 60$		mV (RMS)

Note: number of channels 3 or 6

Technical data of the active insulation detection

Accuracy	Conditions	Value
In the range of 0.1 M $\Omega$ - 10 M $\Omega$	0.1 F ... 2 $\mu$ F; 30 sec	$\pm (15 \% \text{ of rdg.}^* + 30 \text{ k}\Omega)$
	2 $\mu$ F ... 10 $\mu$ F; 100 sec	$\pm (15 \% \text{ of rdg.}^* + 30 \text{ k}\Omega)$
In the range of $> 0 \text{ k}\Omega$ to $\leq 100 \text{ k}\Omega$	0.1 $\mu$ F ... 2 $\mu$ F; 30 sec	$\pm 30 \text{ k}\Omega$
	2 $\mu$ F ... 10 $\mu$ F; 100 sec	$\pm 30 \text{ k}\Omega$
Y-Capacity	0.1 $\mu$ F - 10 $\mu$ F; 30 sec	$\pm 15 \% \text{ of rdg.}^*$
HV to chassis	$\leq 20 \text{ V}$	$\pm 200 \text{ mV}$
	$> 20 \text{ V}$	$\pm 1 \% \text{ of rdg.}^*$

\* rdg. = reading

\*\* rng. = range