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Please contact your closest retailer for additional information

DATA SHEET FOR STANDARD SENSOR TYPE CP149-150-151-152-153-154-174 (FROM 2011)

Sensor Description

Sensor Type	Pressure Sensitive Single Sensor
Typical applications	Infinitely variable resistive user interface devices
Number of active areas / cells	1
Dimensions and available connectors	See layout drawings on annexe

Manufacturing Tolerances

Length and width tolerances	according DIN 7151 IT 14
Thickness	Nominal value (see drawings) +/- 12 %
Total manufacturing tolerance	+/- 0.8 mm (or better on demand)

Base Materials

Topside substrate	PET film
Laminating adhesive	Acrylic
Backside substrate	PET film
Backing adhesive (upon request)	Acrylic

Operating Parameters

Standby resistance (no load)	$R_{NL} > 1 \text{ M}\Omega$
Typical activation resistance range for a pressure range of	$1 \text{ M}\Omega > R_L > 2 \text{ k}\Omega$
Typical Conductor lead resistance	$0.5\text{-}100 \text{ N/cm}^2$ (i.e. per cm^2 of activated area)
Typical lifetime when used according to application advice (see page 2)	$\leq 25 \text{ }\Omega$
Typical sensor response time on single activation	$> 1.000.000$ cycles @ 1kg/cm^2 and 1Hz
Current density	2-3 ms (mechanical)
Parasitic capacitance	$< 1 \text{ mA/cm}^2$ (of activated area)
Power dissipation	$< 1 \text{ nF}$ (very low capacitance on demand)
	$< 1 \text{ mW/cm}^2$ (of activated area)

Operating Conditions

Nominal operating voltage	1..5 V, other driving voltages on demand Use pulsed voltage (duty cycle $< 1 \%$) for extended lifetime and heavy duty conditions
Operating temperature range	-40 to $+85 \text{ }^\circ\text{C}$ (-40 to $185 \text{ }^\circ\text{F}$)
Operating humidity range	$\leq 95 \%$ R.H.

Standard Test Criteria at Time of Delivery

Standby resistance	$R_{NL} > 1 \text{ M}\Omega$ @ RT and 5 V DC
Measuring device	IEE load applicator (see table 1 for load values)
Force probe surface material	Rubber pad
Thickness of pad	2 mm +/- 0.2 mm
Rubber hardness	65 Shore A (+/- 10 Shore A)

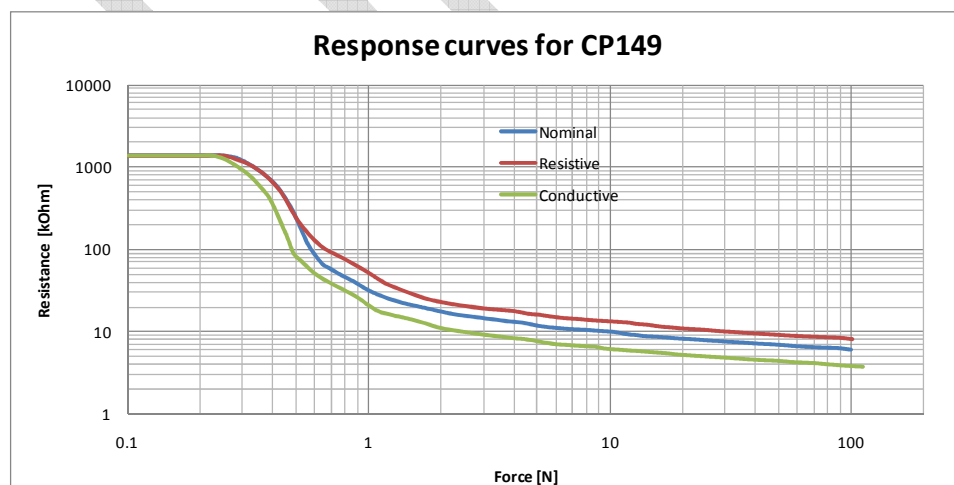
Endtest criteria:

Sensor Type	Detection area dimension	Force probe diameter	Test weight load	Typical resistance at test load
Standard 149	circular, $\varnothing$ 6mm	4 mm	500 g	$30 \text{ k}\Omega > R_L > 3 \text{ k}\Omega$
Standard 150	$8.1 \times 7.5 \text{ mm}$	6 mm	1100 g	$15 \text{ k}\Omega > R_L > 5 \text{ k}\Omega$
Standard 151	circular, $\varnothing$ 12 mm	6 mm	1100 g	$15 \text{ k}\Omega > R_L > 5 \text{ k}\Omega$
Standard 152	circular, $\varnothing$ 15.2 mm	6 mm	1100 g	$15 \text{ k}\Omega > R_L > 5 \text{ k}\Omega$
Standard 153	$22.3 \times 21.6 \text{ mm}$	6 mm	1100 g	$15 \text{ k}\Omega > R_L > 5 \text{ k}\Omega$
Standard 154	$40.6 \times 40.3 \text{ mm}$	6 mm	1100 g	$15 \text{ k}\Omega > R_L > 5 \text{ k}\Omega$
Standard 174	circular, $\varnothing$ 24.8 mm	6 mm	1100 g	$15 \text{ k}\Omega > R_L > 5 \text{ k}\Omega$

Application Advice

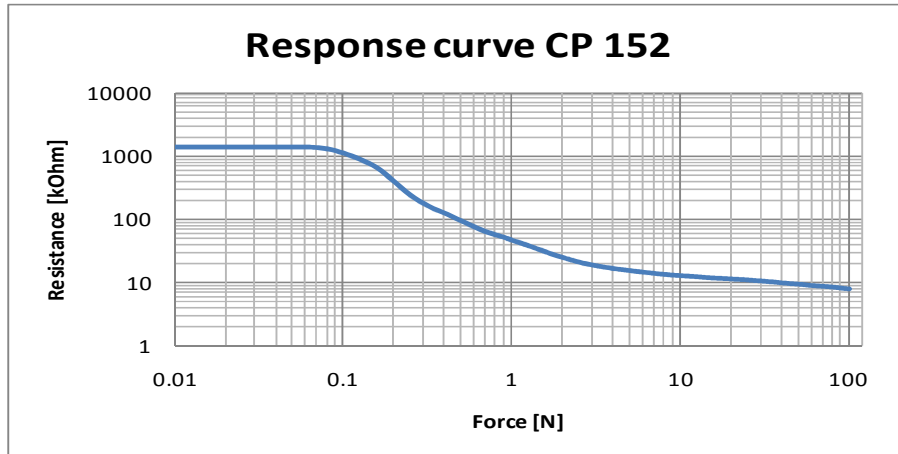
- The sensor should be mounted onto an even, smooth, and hard support surface like, e.g., a plastic, glass or metal plate.
- The actuator should always be placed perpendicular to the sensor surface in the centre of the active area. Avoid offset mounting. Ensure that the actuator is smaller than the active area of the sensor. If this is not feasible, use a soft activator for force transmission and distribution like, e.g., a soft rubber with hardness ≤ 25 Shore A.
- Do not expose the sensor to permanent load to avoid possible signal drift.
- Never bend the sensor in the active area to avoid mechanical pre-load and false signals.
- Do not bend the connection tail to a radius $< 8 \text{ mm}$ to avoid broken conductor lines.
- All sensors feature an air vent. Take care not to block it and to avoid liquids from penetrating through it.

Examples of response curve

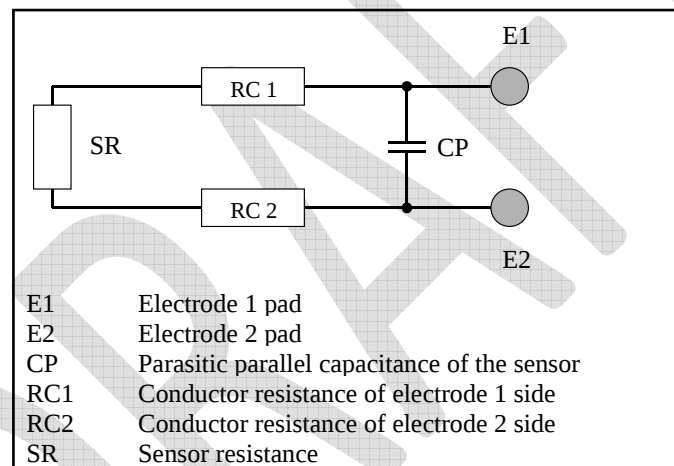


[Response curve depending on actuator shape material and design

Measurements performed with 4mm probe diameter covered with rubber of 65 Shore A, 2mm thick on limit samples of FSR resistivity]



[Response curve depending on actuator shape material and design
Measurements performed with 6mm probe diameter covered with rubber of 65 Shore A, 2mm thick]



Simplified sensor equivalent circuit

Use an ohmmeter with PC interface option for dynamic data recording. An ordinary ohmmeter will be sufficient, if you do not intend to record data.

General Statement

The use of our proprietary pressure sensing technology is very flexible, thus allowing tailor-made design solutions on a relatively short time scale. Almost any shape or size can be designed. If this sensor type does not fulfil your demands, please feel free to contact your closest retailer concerning the availability of other sensor types for your application.

Liability Issues

IEE sensors are designed for multiple use and will easily exceed the stated typical lifetime when used according to IEE instructions.

All values listed in datasheets are typical values. IEE cannot be held responsible for any deviation from these values unless a mutually agreed specification concerning a specific sensor design and performance has been signed.

The suitability of a chosen sensor for a specific application is not the concern of IEE, unless a complete sensor specification has been compiled by the customer and accepted by IEE. That specification must describe in detail every aspect of the desired application as well as the use of the sensor in said application.

Subsequent testing to prove the suitability of the sensor for a specific application does not supersede IEE specification sheets.

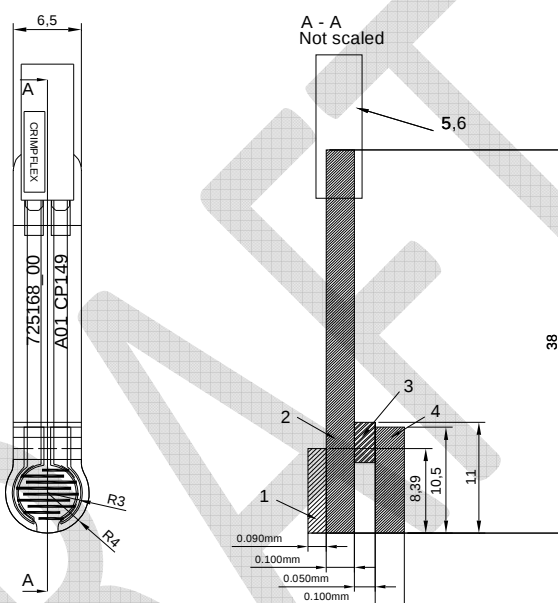
IEE refuses any responsibility for sensors used in applications of which IEE has no notice. The same is valid for applications of which IEE has been informed, if no written agreement stating specific features exists.

The customer is responsible for the validation of the IEE sensor in the end product.

This general specification sheet has been created on 15.03.11 and supersedes all previous versions.

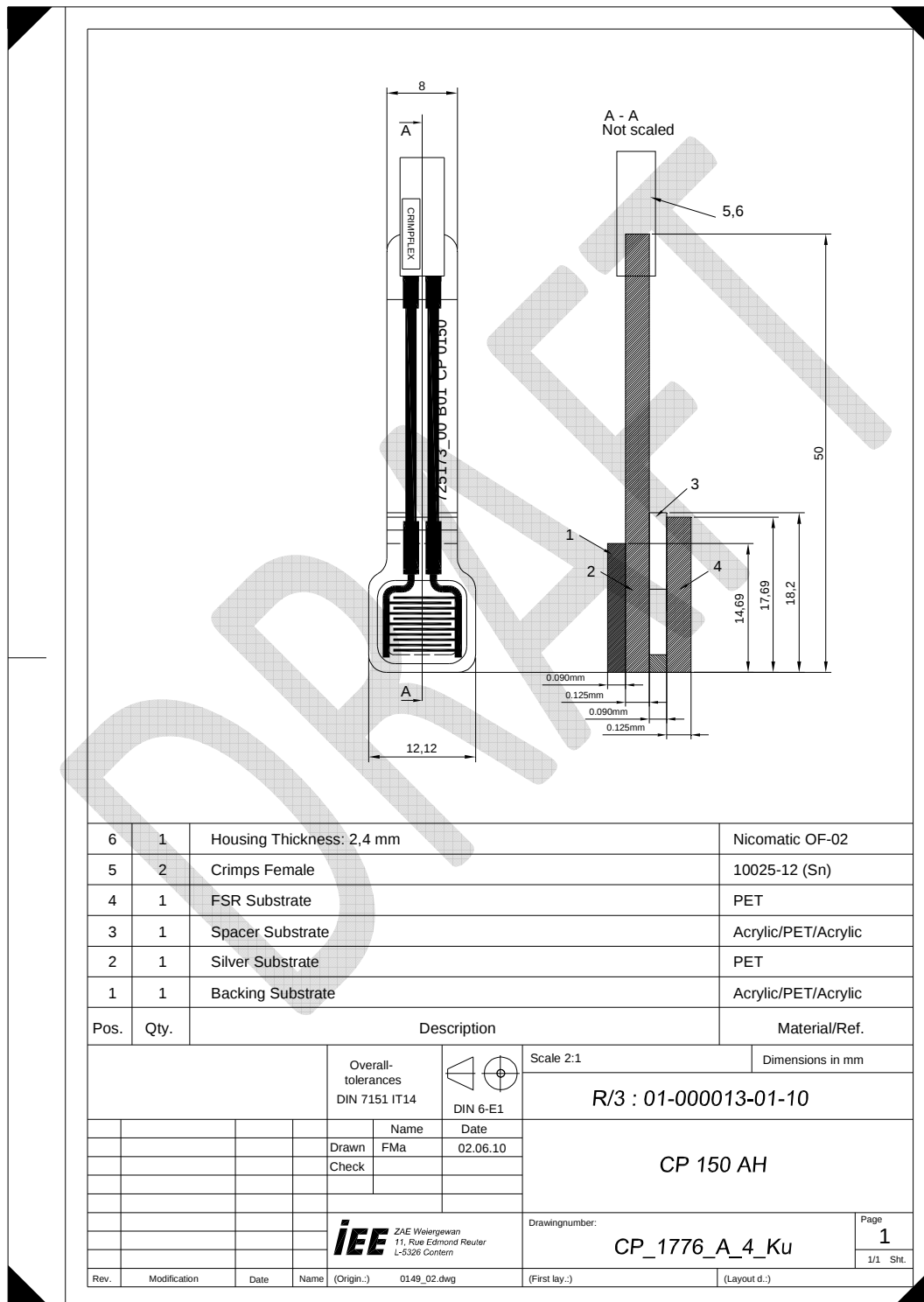
Depending on the presence of backing adhesive or not and the connection method, CP sensors are available in different configurations

Sensor Reference	Backing adhesive	Crimp type	Housing	Sensor drawing
CP 149 NN	No	No crimps	No	CP_1770_A_4_Ku
CP 149 NS	No	Male	No	CP_1768_A_4_Ku
CP 149 NH	No	Female	Yes	CP_1769_A_4_Ku
CP 149 AN	Yes	No crimps	No	CP_1765_A_4_Ku
CP 149 AS	Yes	Male	No	CP_1766_A_4_Ku
CP 149 AH	Yes	Female	Yes	CP_1767_A_4_Ku

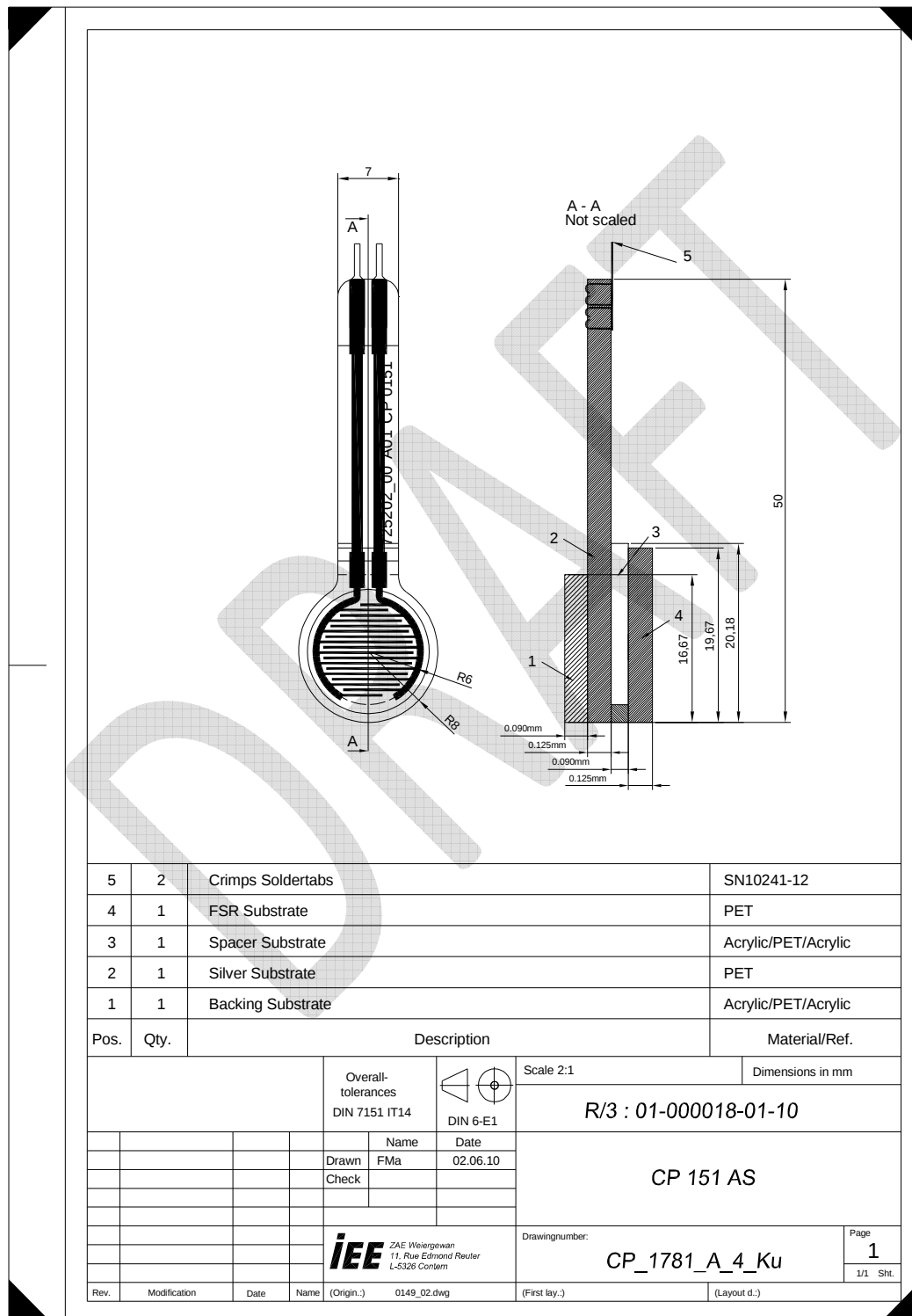


6	1	Housing Thickness: 2,4 mm			Nicomatic OF-02	
5	2	Crimps Female			10025-12 (Sn)	
4	1	FSR Substrate			PET	
3	1	Spacer Substrate			Acrylic/PET/Acrylic	
2	1	Silver Substrate			PET	
1	1	Backing			Acrylic/PET/Acrylic	
Pos.	Qty.	Description				Material/Ref.
		Overall-tolerances DIN 7151 IT14		 DIN 6-E1	Scale 2:1	Dimensions in mm
		R/3 : 01-000007-01-10				
			Name	Date	CP 149 AH	
		Drawn	Fma	02.06.10		
		Check				
		 ZAE Weiergewan 11, Rue Edmond Reuter L-5326 Contern			Drawingnumber: CP_1767_A_4_Ku	
Rev.	Modification	Date	Name	(Origin.) 0149 02.dwg	(First lav.)	(Layout d.)
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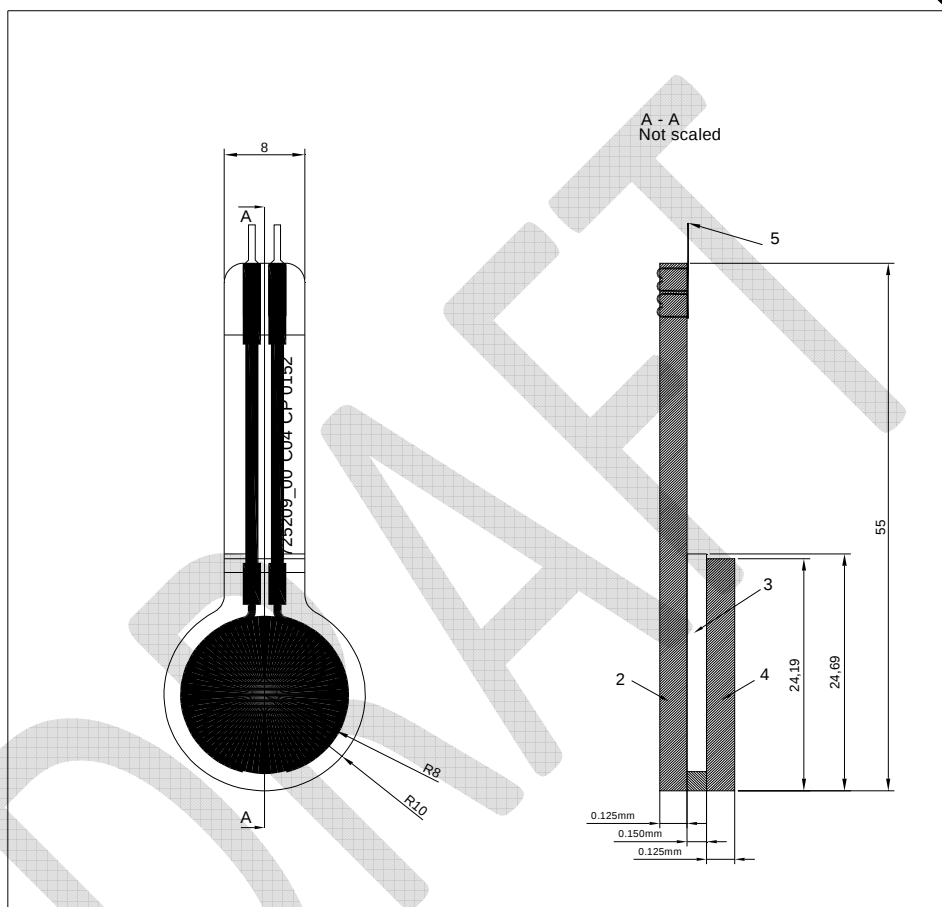
Sensor Reference	Backing adhesive	Crimp type	Housing	Sensor drawing
CP 150 NN	No	No crimps	No	CP_1771_A_4_Ku
CP 150 NS	No	Male	No	CP_1772_A_4_Ku
CP 150 NH	No	Female	Yes	CP_1773_A_4_Ku
CP 150 AN	Yes	No crimps	No	CP_1774_A_4_Ku
CP 150 AS	Yes	Male	No	CP_1775_A_4_Ku
CP 150 AH	Yes	Female	Yes	CP_1776_A_4_Ku



Sensor Reference	Backing adhesive	Crimp type	Housing	Sensor drawing
CP 151 NN	No	No crimps	No	CP_1777_A_4_Ku
CP 151 NS	No	Male	No	CP_1778_A_4_Ku
CP 151 NH	No	Female	Yes	CP_1779_A_4_Ku
CP 151 AN	Yes	No crimps	No	CP_1780_A_4_Ku
CP 151 AS	Yes	Male	No	CP_1781_A_4_Ku
CP 151 AH	Yes	Female	Yes	CP_1782_A_4_Ku

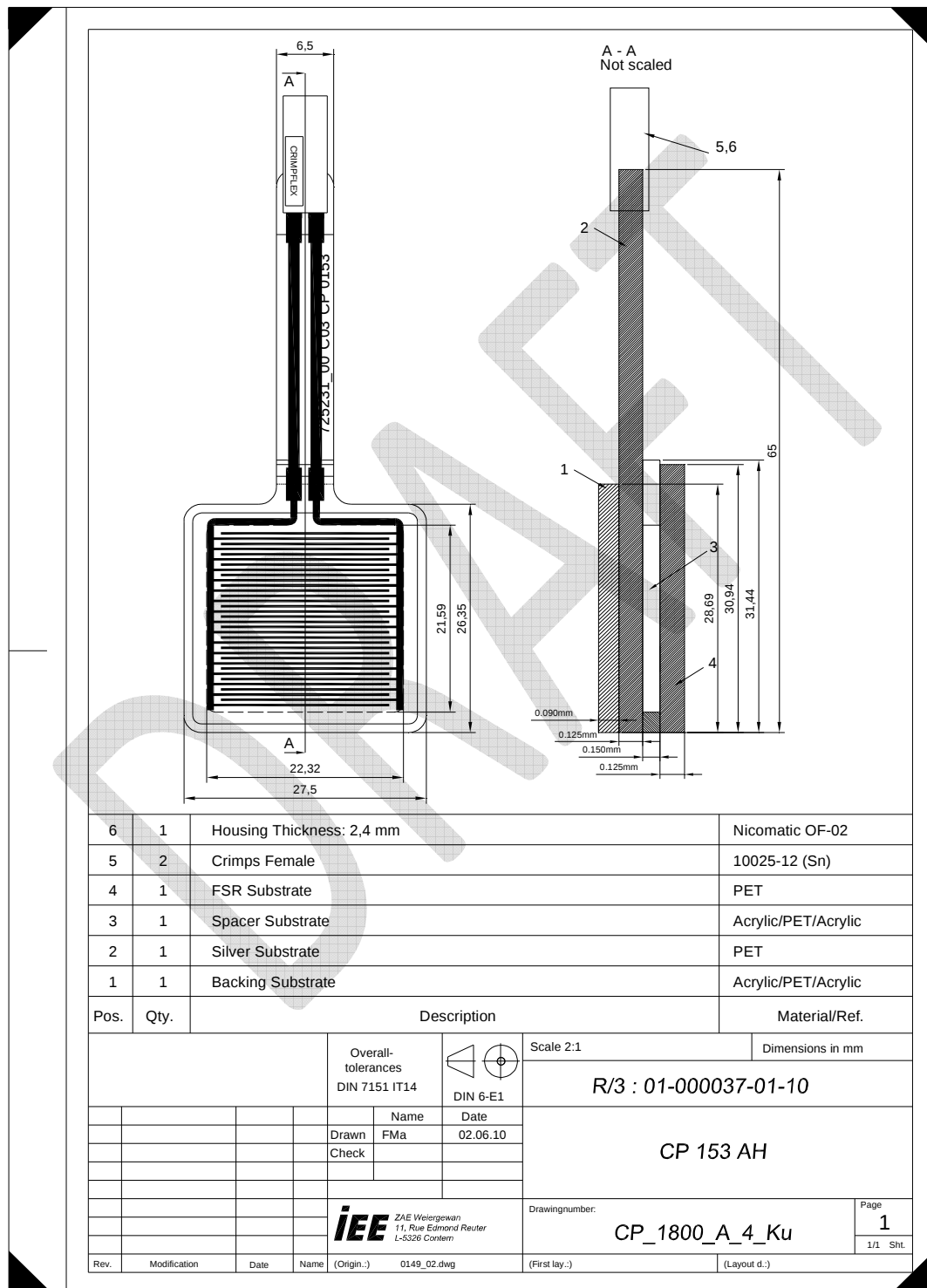


Sensor Reference	Backing adhesive	Crimp type	Housing	Sensor drawing
CP 152 NN	No	No crimps	No	CP_1783_A_4_Ku
CP 152 NS	No	Male	No	CP_1784_A_4_Ku
CP 152 NH	No	Female	Yes	CP_1785_A_4_Ku
CP 152 AN	Yes	No crimps	No	CP_1786_A_4_Ku
CP 152 AS	Yes	Male	No	CP_1787_A_4_Ku
CP 152 AH	Yes	Female	Yes	CP_1788_A_4_Ku
CP 152 NF	Yes	Female	No	CP_1813_A_4_Ku
CP 152 AF	Yes	Female	No	CP_1814_A_4_Ku

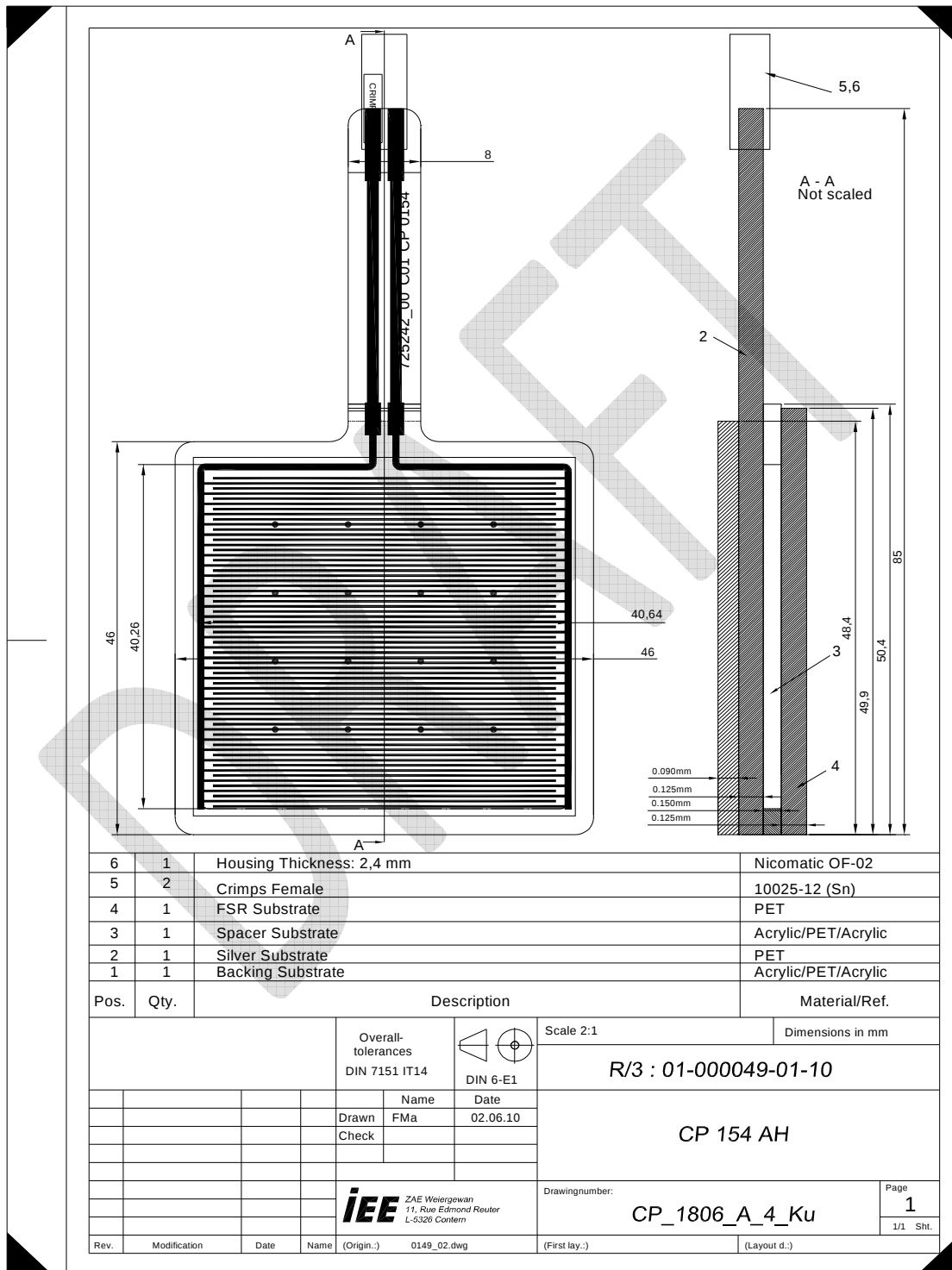


5	2	Crimps Soldertabs		SN10241-12	
4	1	FSR Substrate		PET	
3	1	Spacer Substrate		Acrylic/PET/Acrylic	
2	1	Silver Substrate		PET	
Pos.	Qty.	Description			Material/Ref.
		Overall-tolerances DIN 7151 IT14		 DIN 6-E1	Scale 2:1 Dimensions in mm R/3 : 01-000021-01-10
			Name	Date	CP 152 NS
		Drawn	FMa	02.06.10	
		Check			
		 ZAE Weiergewan 11, Rue Edmond Reuler L-5326 Contern			Drawingnumber: CP_1784_A_4_Ku
Rev.	Modification	Date	Name	(Origin..)	(First lay.:) (Layout d.)
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Sensor Reference	Backing adhesive	Crimp type	Housing	Sensor drawing
CP 153 NN	No	No crimps	No	CP_1795_A_4_Ku
CP 153 NS	No	Male	No	CP_1796_A_4_Ku
CP 153 NH	No	Female	Yes	CP_1797_A_4_Ku
CP 153 AN	Yes	No crimps	No	CP_1798_A_4_Ku
CP 153 AS	Yes	Male	No	CP_1799_A_4_Ku
CP 153 AH	Yes	Female	Yes	CP_1800_A_4_Ku



Sensor Reference	Backing adhesive	Crimp type	Housing	Sensor drawing
CP 154 NN	No	No crimps	No	CP_1801_A_4_Ku
CP 154 NS	No	Male	No	CP_1802_A_4_Ku
CP 154 NH	No	Female	Yes	CP_1803_A_4_Ku
CP 154 AN	Yes	No crimps	No	CP_1804_A_4_Ku
CP 154 AS	Yes	Male	No	CP_1805_A_4_Ku
CP 154 AH	Yes	Female	Yes	CP_1806_A_4_Ku



Sensor Reference	Backing adhesive	Crimp type	Housing	Sensor drawing
CP 174 NN	No	No crimps	No	CP_1807_A_4_Ku
CP 174 NS	No	Male	No	CP_1808_A_4_Ku
CP 174 NH	No	Female	Yes	CP_1809_A_4_Ku
CP 174 AN	Yes	No crimps	No	CP_1810_A_4_Ku
CP 174 AS	Yes	Male	No	CP_1811_A_4_Ku
CP 174 AH	Yes	Female	Yes	CP_1812_A_4_Ku

