

Welcome to TMC Sensortechnik!



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Welcome to TMC Sensortechnik GmbH

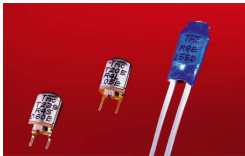


Our mission:

"We protect against overheating:
electric motors, transformers, lasers,
plugs, batteries, et al."



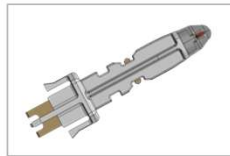
Our Products



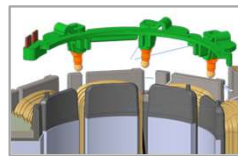
Micro-Switches



Sensors

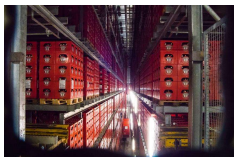


Components,
e.g. „rockets“



„Click & Play“
built-in systems

Our Customers



Control & Drive
technology



Heating &
A/C



Pumps



Specialities,
incl. laser

Key figures (selection, as of 03/2025)

+22%
sales growth
in 2025

Zero
claims with
base switches
in 2025

99%
of all raw
materials
from Europe

20
active
patent-
families

2
plants
Bretten / D
& Police / CZ

1 **BGF**
EnzTECH
sister corp.
for stamping,
moulding tech

>80
Employees
out of >20
nations

>200
Mio. Temp-
sensors
since 1995

Registrations worldwide (selection)



ISO 9001



ISO 14001

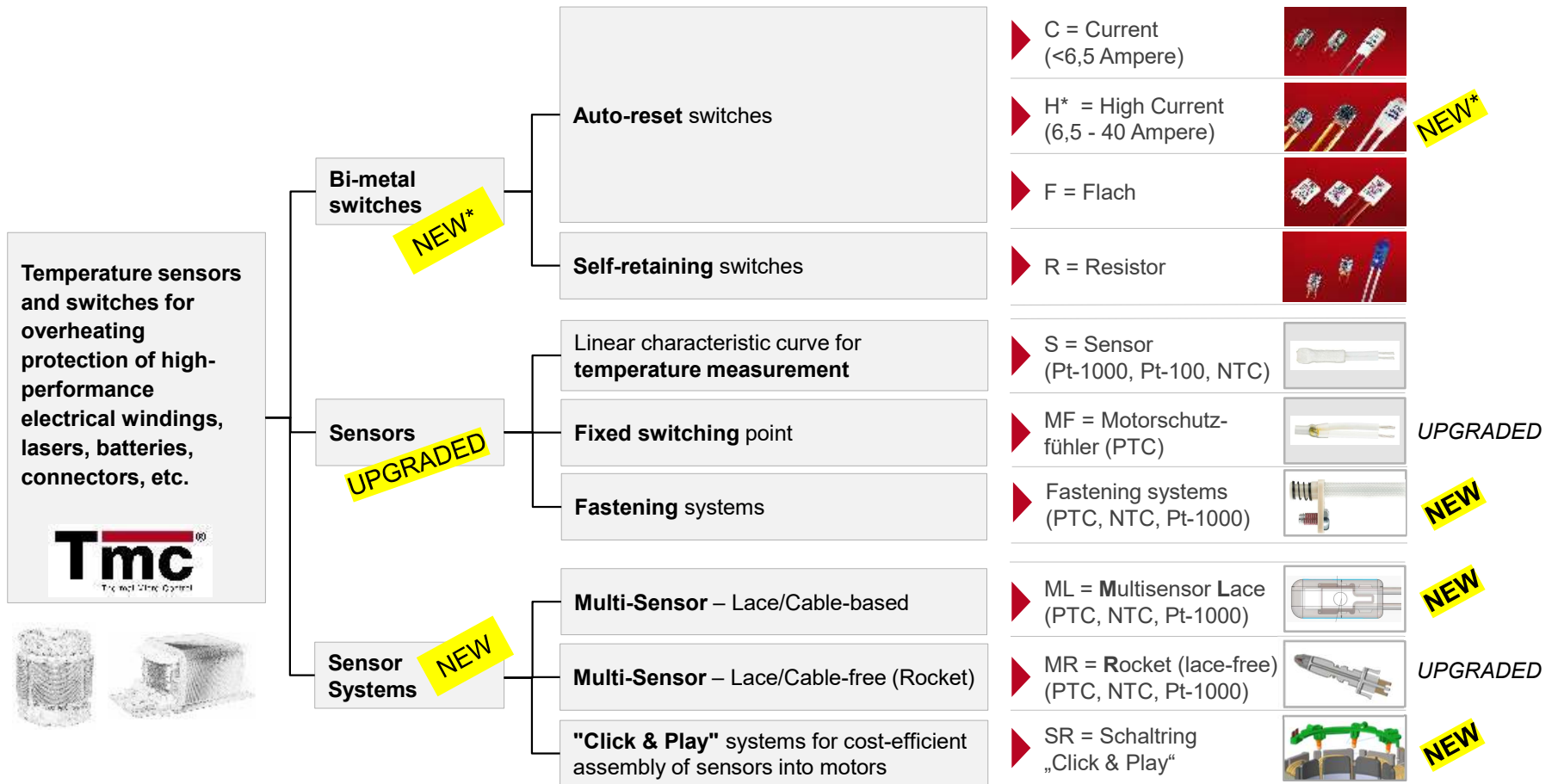


TMC – Our Products for thermal protection

Status: May 2025

Logic

Product type



* Re-Design / Upgrade in process, Launch: Q2 2026

„H“ Bimetal Switch by TMC: >10.000 switchings at 10A

10 Ampere:
>10.000 switchings

Proven shape
i.e. 1:1 interchangeable

New materials
und **contact alloys**
for highest performances



Globally approved

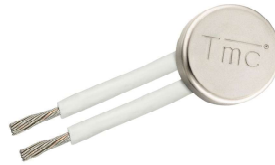
Proven connecting technology

Patented enhancements
(wip)

General serial availability:

- H1 (10A): Start Q3 2026
- H8 (up to 40A): Start Q1 2027

„H“ Bimetall Switch by TMC: Technical Data



Technische Daten (Auswahl)*	H1 von TMC	H8 von TMC	Marktbegleiter 1	Marktbegleiter 2
Kontaktprinzip	Öffner	Öffner	Öffner	Öffner
Nennschalttemperatur (NST)	70 °C - 190 °C	50 °C - 200 °C	70 °C - 190 °C	70 °C - 200 °C
Rückschalttemperatur (RST)	40 K ± 15 K	40 K ± 15 K	30 K ± 15 K**	50 K ± 15 K (≥ 100 °C; ≤ 180 °C NST)
Baugröße	6,3 x 10,5 x 17 mm	4 x 9,5 x 23 mm	6,3 x 10,5 x 19 mm	7 x 10,5 x 17,5 mm
Druckbeständigkeit des Schaltergehäuses	> 600N	> 600N	> 600N	600 N
Standardanschluss	AWG18 - AWG24	AWG18 - AWG24	AWG18 - AWG24	Litze 0,75mm ² / AWG18
Betriebsspannung AC / DC	bis 500 V AC / 48 V DC	bis 500 V AC / 48 V DC	250 V AC	bis 500 V AC / 28 V DC
AC cos φ = 1,0 / Zyklen	10,0 A/250V / 10.000	16,0 A/250V / 10.000	10,0 A/250V / 10.000	10,0 A/250V / 10.000
AC cos φ = 0,6 / Zyklen	6,3 A/250V / 10.000	10,0 A/250V / 10.000	6,0 A/250V / 10.000	6,3 A/250V / 10.000
Max. Schaltstrom AC cos φ = 1,0 / Zyklen	30,0 A/250V / 100	45,0 A/250V / 300	30,0 A/250V / 100	25,0 A / 100
Hochspannungsfestigkeit	2,0 kV	2,0 kV	2,0 kV	2,0 kV
Schutzgrad	IP 00	IP 00	IP 00	IP 00
Verfügbare Approbationen (Auswahl)	VDE, UL, cUL, CQC	VDE, UL, cUL, CQC	VDE, UL, CSA/cUL, CQC	IEC, ENEC, VDE, UL, CSA, CQC

* Vorläufige Werte für H1 und H8

** An den NST-Grenzen kann die RST abweichen, bei NST > 130 °C beträgt die RST 30 K -15 K/+30 K

General serial availability:

- H1 (10A): Start Q3 2026
- H8 (up to 40A): Start Q1 2027

ML = Multi-Sensor Lace/Cable-based by TMC ... SOP in H2 2026

Traditional Sensors

Pt1000
Sensor



NTC
Sensor



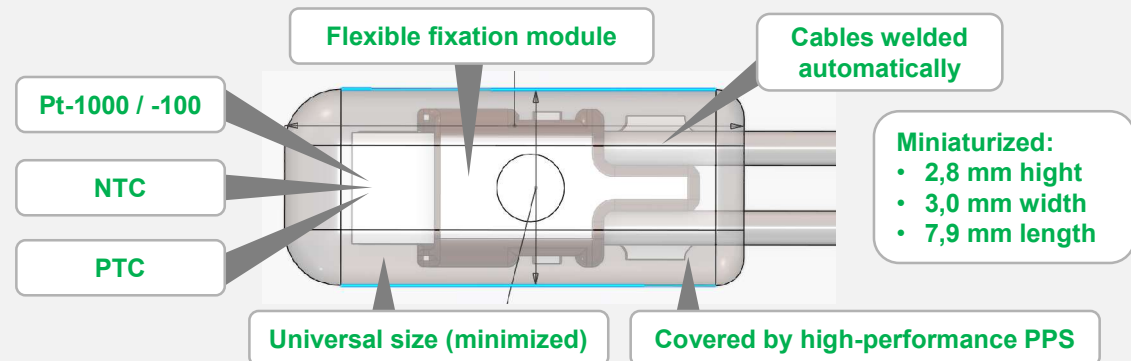
PTC
Sensor



Challenges:

- **Good performance**, but: **Can we do it better?**
 - Too **large**?
 - Too little **pressure resistance**?
 - Too little **dielectric strength**?
 - Too much **partial discharge**?
- Different sensors have **different sizes**, i.e.
 - No **exchangability**
 - No **late product differentiation**

„ML Multi-Sensor“



Advantages:

- **Smaller:** Miniaturized to just 2,8 * 3,0 * 7,9 mm (choice: Cuboid or cylinder shape)
- **Cheaper:** Cost-efficient and safe through automation
- **High pressure resistance:** min. 200 N (much more if required)
- **High dielectric strength:** min. 2,5 kV; 4,5 kV available
- **Longer lifetime:** Improved partial discharge
- **Simplified supply-chain:** Universal form for ALL sensor types allows flexible assembly and late product differentiation
- **Safe assembly:** Color-/number-Coding ensures unmistakableness
- **Lace-/Cable-based** (Note: For lace-/cable-free solutions: See MR „Rocket“ by TMC)

MR = Multi-Sensor „Rocket“ (lace/cable-free) by TMC ... available!

Traditional Sensors

Pt1000
Sensor



NTC
Sensor



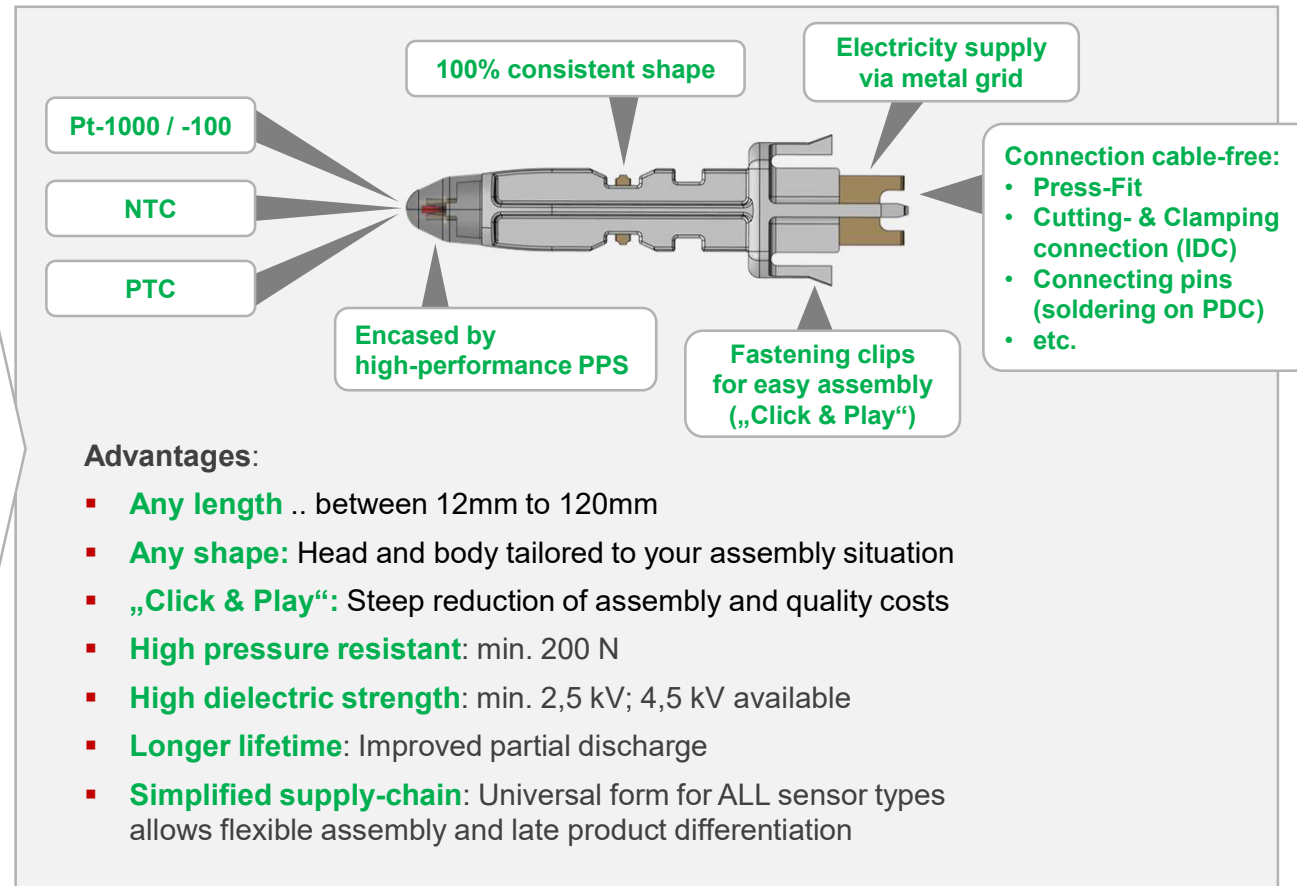
PTC
Sensor



Challenges:

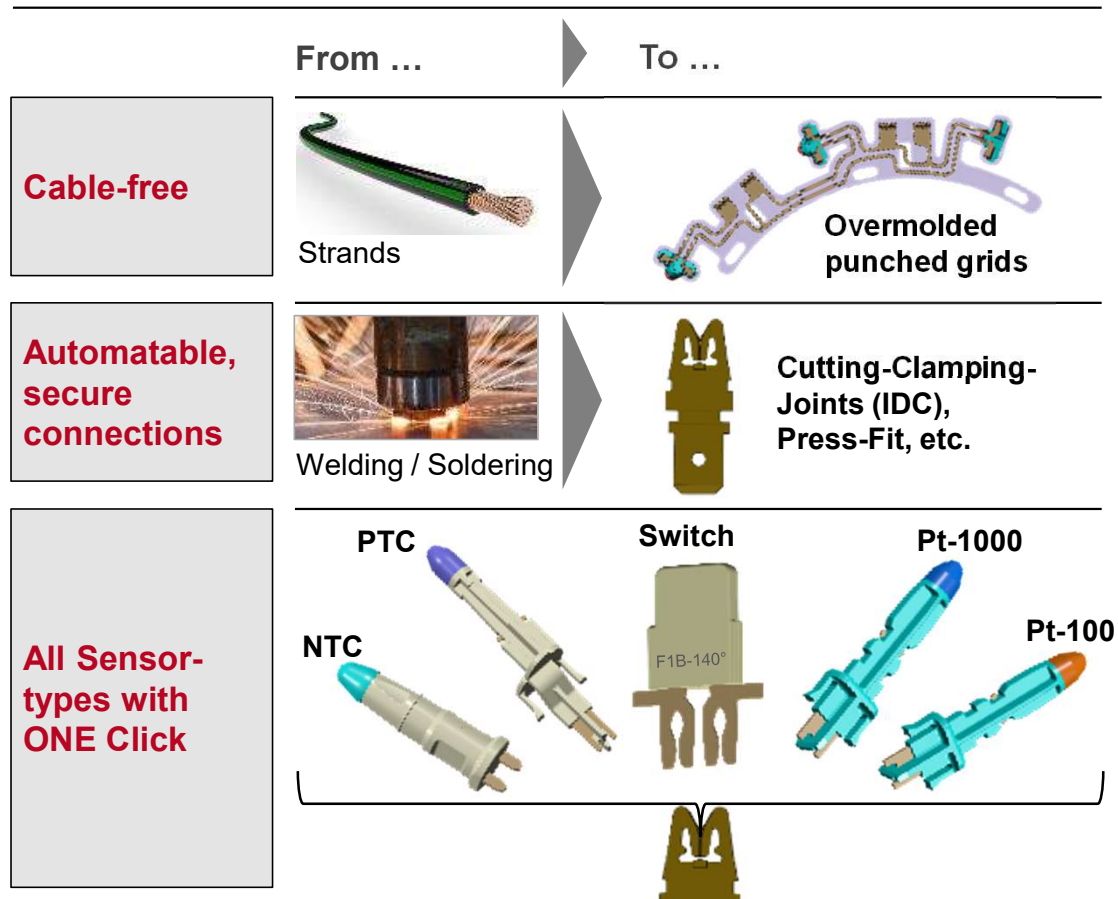
- **Good performance**, but: **Can we do it better?**
 - Too little **pressure resistance?**
 - Too little **dielectric strength?**
 - Too much **partial discharge?**
- **High variation in size/shape**,
i.e. can not be placed to winding precisely
- Different sensors have **different sizes**, i.e.
 - No **exchangability**
 - No **late product differentiation**

MR Multi-Sensor „Rocket“ (lace-/cable-free)



Recent TMC Innovation: Efficiency Leaps through cable-free „Click & Play“

What is „Click & Play“?



Click & Play leads to ...



Reduction of Product Costs

... through modularization and functional integration of temperature protection and connection technology



Reduction of Assembly Costs

... through automation in motor-assembly



Reduction of Error Costs

... through the design of the temperature protection* and automation in the motor assembly



Efficient from 10.000 Motors p.a.

... through consistent modularization of temperature protection and connection technology

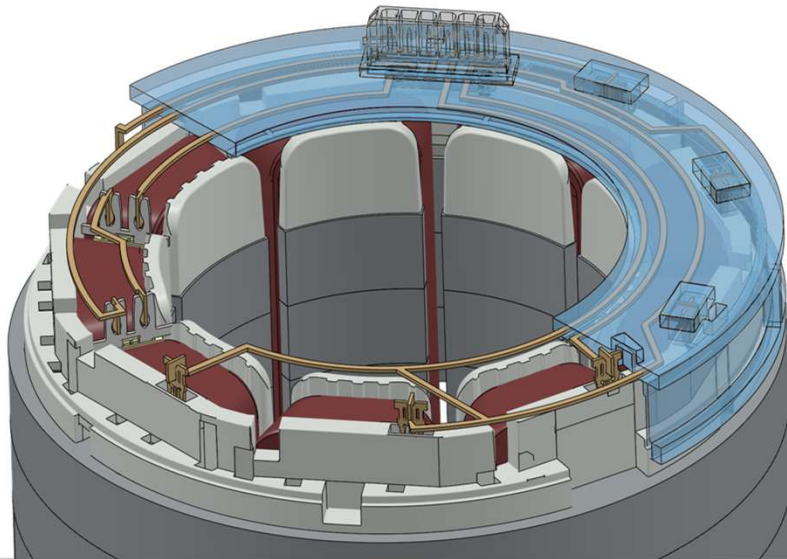
* e.g. colouring to prevent confusion, DMC coding, etc.

„Click & Play“: Customer example ... for concentrated windings

– SANITIZED

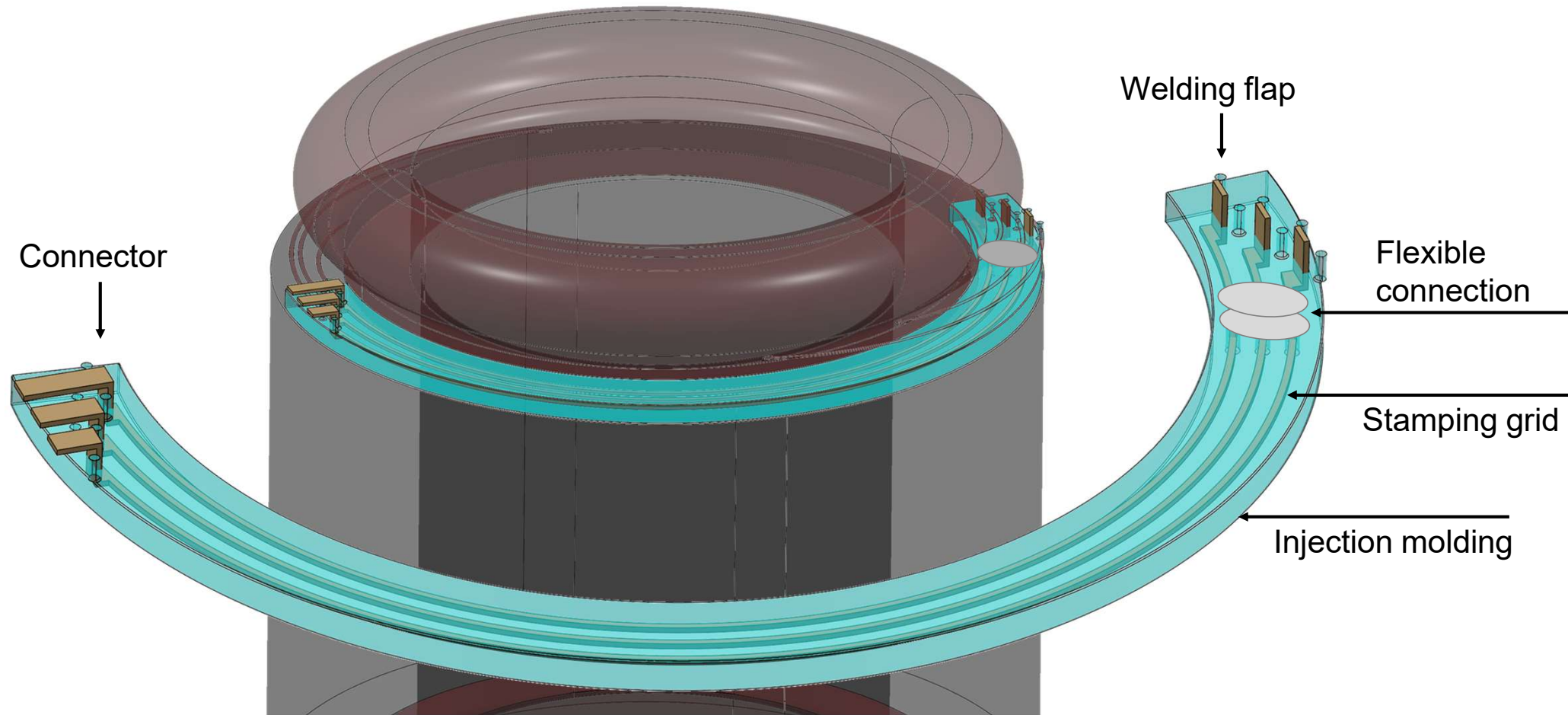
- **E-motor for drive technology**
- Sensor flexibility: 2, 1 or no bi-metall-F-switch (140°) and/or 1 Pt-1000 sensor
- Star or triangle circuit ... from one & the same tool
- Contacting of winding leads through IDC or standardized connecting plug

- **E-motor for cooling pumps**
- 3 PTC „Rockets“ in parallel connection und 3 Pt-1000 sensors in single connection
- Parallel and series connection from one & the same tool
- Flexible fastening (spring elements) for constant thermal connection to wiring; safe connection via IDC



„Click & Play“: Customer example ... for distributed windings

– SANITIZED



„Click & Play“: We reduce your assembly costs by >50%

Customer example

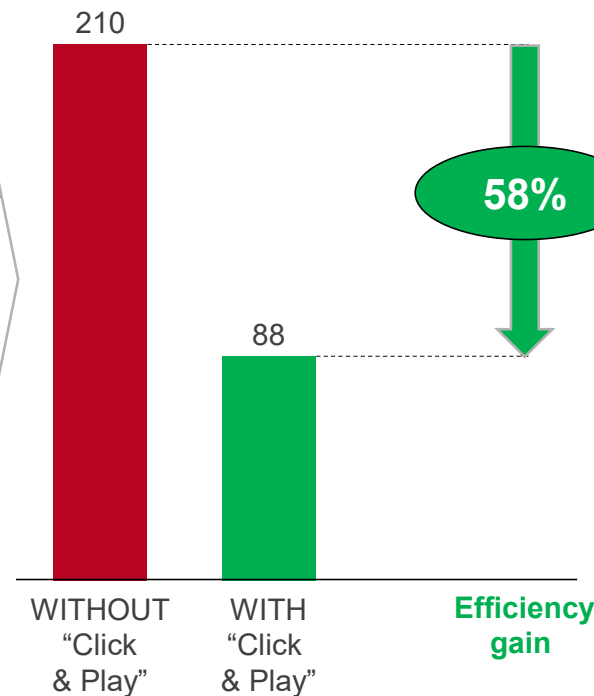


Segment: Heating & Ventilation

- 100.000 motors p.a.
- 98,- EUR/hour assembly total cost
- Before: 210 seconds assembly work per motor, incl. mounting of sensors by hand

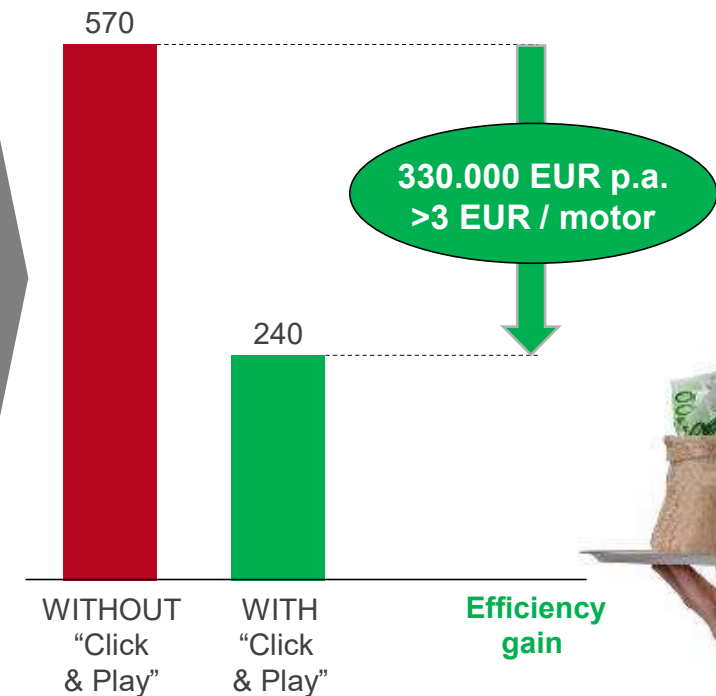
Reducing assembly time through “Click & Play”

in seconds per motor



Reducing assembly cost* through “Click & Play”

in T-Euro p.a.



* Hier OHNE zusätzliche Reduktion von Fehlerkosten

TMC – Success Factors: What's unique about us?

- ✓ **Trustful Development Partnerships** with all key customers
- ✓ **Leading in Product Innovation**
 - **“Click & Play” (patented)**: Significant cost savings, esp. in assembly, starting with 10.000 motors p.a.
 - **MR “Rockets” (patented)**: Next generation sensor fixation for automated, cost-reducing assembly by customers
 - **ML Multisensor (patented)**: Cost reduction for customers through late product differentiation
 - **H-Switch for >10 Ampere** with >10.000 switchings ... up to >40 Ampere with >300 switchings
 - **F-Series (patented)**: The world's smallest bimetall switch
 - **S-Series (patented)**: Leading in Pt-1000 quality and consistency due to automation “Made-in-Europe”
- ✓ **Regional Supply Chains – “Made-in-Europe”**:
... >40% from Bretten/Pforzheim, >70% from Germany, **>99% from Europe**
- ✓ **Product Reliability: Zero claims** with our base switches in 2025
- ✓ **Delivery Reliability** ... also due to regional supply chains
- ✓ **Company Culture: “Honest, together and with superior capabilities, we serve our customers!”**

TMC Leadership Values

„Honest, Together and with superior Capabilities .. we serve our Customers!“



1 For orientation: The described criteria are defined as follows: **Beginner** = Sometimes, **Advanced** = Often, **Adept** = Mostly, **Master** = (Almost) always & everywhere.

2 „Expertise“ depends on the role / position in the TMC organisation. The above mentioned „Expertise“ applies to the role of „TMC Management Team“

Thank you for your attention!

We are glad to serve you anytime in case you have additional questions:

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