



FORCIOT®
GRIP

NEXT GENERATION
**STRETCHABLE
MULTISOLUTION**
FOR SAFE WORKING

Forciot® GRIP - a game changing HMI solution, which brings additional efficiency and more functionality.

GRIP combines several functionalities into one multisolution to bring advanced grip detection, levels of force, and now also as new functionality heating, for enhanced safety and user experience.

Printed and stretchable electronics combined with advanced algorithms, GRIP revolutionizes grip detecting providing accurate force data in all conditions with multiple sensing zones, allowing design freedom to easily integrate into any surface, size and shape, regardless of the surface material.

Forciot® GRIP is unique wrapped handlebar control panel for electrical engine-assisted handling of heavy trolleys, manual forklifts, lawn movers, etc. Solution enables users working with heavy loads and on non-smooth grounds inside and outside, to use smaller machines instead of large and more expensive machines.

FORCIOT GRIP



PRESSURE SENSING

Measuring from gentle touches to firm grip force accurately

STRETCHABLE HEATING ELEMENT

In one solution



SAFETY

GRIP DETECTION

- Detecting grip force
- Multiple sensing zones
- Measuring gentle touches to firm grip force accurately
- Improved safety and health in work environment



COMFORT

STRETCHABLE HEATING ELEMENT

- Seamless temperature control
- Thin solution
- Intuitive placing and advanced functions



COST REDUCTION

DESIGN & MANUFACTURING

- Light weight
- Less layers
- Less electronics
- Cost savings from uptime and work efficiency with controls that reduce load and assist in turns



SIMPLICITY

ALL-IN-ONE MULTISOLUTION

- Sensor
- Heater element
- Software & ECU interface
- Care-free and sustainable solution with no mechanical parts, durable materials, IP-rated

GRIP DETECTING AND HANDLING ASSISTANCE:

-  PUSH/ PULL WITH FORCE SENSING
-  TURNS WITH FORCE SENSING
-  ONE/TWO HAND USE GIVING MORE FLEXIBILITY
-  ADDITIONAL FUNCTION BUTTONS IN THE SAME STRUCTURE

INCREASED SAFETY IN A COST-EFFECTIVE WAY

| | | SAFETY | COST SAVING | UX | SUSTAINABILITY |
|---------------|--|--------|-------------|----|----------------|
| TECHNOLOGY | Accurate data under all conditions | • | | • | |
| | Detects human hand (force sensing and SW dynamic result) | • | | • | |
| | HMI control to assist user in operating | • | | • | |
| | Unrestricted shapes and sizes of measurement zones | • | | • | |
| | Sensor fusion compatible | • | | • | |
| FUNCTIONALITY | Heater functionality | | • | • | |
| | Self-calibrating algorithms to ensure functionality for product lifetime | • | | • | • |
| | Distraction and Drowsiness Recognition from grip level (DMS) | • | | | |
| | Static poses and dynamic poses (DMS) | • | | | |
| | Warning the driver when distracted and not good grip (DMS) | • | | • | |
| | Accurate data with several surface materials | • | | • | |
| DESIGN | Intuitive design opportunity | • | | • | |
| | Less layers and stretchable material enable any shape | | • | | |
| | Using same technology in car interiors in other solutions | | • | • | |
| | Sensors are seamlessly merged | | • | • | |
| MANUFACTURING | Supply chain simplicity | | • | | |
| | Additive manufacturing | | • | | • |
| | Less waste | | • | | • |
| | Less assembly work, one component | | • | | |
| | Lower capital expenditures than traditional electronics manufacturing | | • | | |

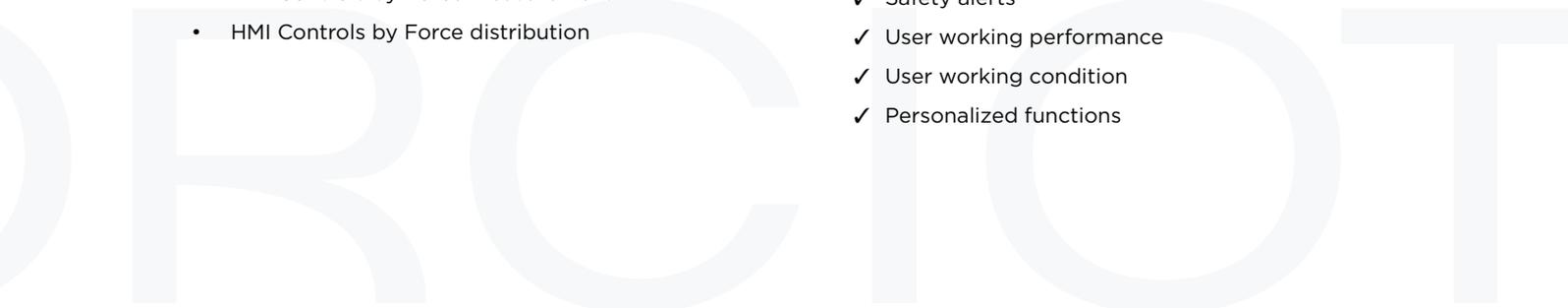
OPTIONAL FEATURES

Mechanical buttons can be replaced with functional areas for minimalistic and intuitive user experience.

- HMI Controls by Force measurement
- HMI Controls by Force distribution

DATA & ANALYTICS

- ✓ Accurate data under all conditions
- ✓ Sensor fusion
- ✓ Safety alerts
- ✓ User working performance
- ✓ User working condition
- ✓ Personalized functions



TECHNICAL SPECIFICATION

| PRODUCT SOLUTION | MIN | MAX | UNIT |
|--|---|-----|------|
| Thickness (depending on the configuration) | 0,15 | 1,5 | mm |
| Operating temperature | -40 | 105 | °C |
| Pressure sensing areas | 1 | >10 | |
| Pressure range | 0 | 300 | kPa |
| Heating range | 0 | 50 | °C |
| ELECTRONICS | | | |
| Physical interface | I2C/SPI/UART/CAN/LIN | | |
| Supply voltage | 3-12 V | | |
| Single configurable electronics board | YES | | |
| Automotive Qualified (AEC-Q100) | YES | | |
| SOFTWARE | | | |
| Data interface | Sensing area specific pressure data and/or threshold related decision | | |
| Self-calibrating algorithms | Temperature, humidity and creep compensation | | |

INDUSTRY LEADER IN PRINTED STRETCHABLE ELECTRONICS

FORCIOT[®]

SENSE AND EXCEED

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