

## CALEC® ST III - Standard & Smart

### Technical data sheet

#### Product description

CALEC® ST III is an energy meter used in the areas of:

- commercial buildings / building technology
- near and district heating / district cooling
- residential construction / sanitary

The main applications of the product are:

- System integration component  
With the versatile interfaces of CALEC® ST III the energy data of all thermal applications can be easily integrated in subordinate energy management and building control systems.
- Heating / cooling transmission station  
Together with the various flow meters of INTEGRA Metering AG, the energy calculator CALEC® ST III offers the perfect combination for the determination of performance data in medium heating applications, in particular for distribution stations and larger buildings.



#### Technical data

| Housing and operating conditions     |   |
|--------------------------------------|---|
| Dimension                            |   |
| Ambient temperature                  | +5 ... +55 °C, EN 1434 class C  |
| Storage temperature                  | 0...60 °C   |
| Humidity                             | Max. 95 %   |
| Operating altitude                   | Up to 2000 m above sea level  |
| Protection class                     | IP54 according to EN 60529  |
| Terminals                            | Signal connection: 1.5 mm <sup>2</sup> screw terminals<br>Power connection: 2.5 mm <sup>2</sup> screw terminals |
| Lifetime                             | Operational period 15 years, includes 3 cycles of calculator-module and thermal probes replacement.             |
| Protection against mechanical stress | Vibrations / shock according to EN 1434 – 7.23  |
| Mounting                             | Wall mounting with 3 points<br>DIN-rail mounting (DIN-EN 50222)   |

| Housing and operating conditions                                |   |
|---|---|
| Cable inlets  | 1x Ø 4-8 mm power port<br>4x Ø 2.5-5 mm signal port<br>1x Ø 4-8 mm signal port  |
| Basic data for calculator                                       |   |
| Temperature measuring range                                     | 0...+200 °C (heat carrier: water)<br>-40...+180 °C (special heat carrier)   |
| Temperature difference  | 0...199 K<br>Type approval 3...190 K<br>On demand 1...199 K and 2...199 K   |
| Temperature sensor  | Pt 100, Pt 500, Pt1000 according to IEC 751 paired in accordance with EN 1434<br>2-wire or 4-wire connection.<br>Max. sensor cable length 2-wire connection: 10 m<br>Max. sensor cable length 4-wire connection: 100 m  |
| Temperature measurement resolution                              | 20 bit resolution, typical $\pm 0.005$ K ( $T_a = 5...55$ °C)   |
| Installation side   | Hot or cold side  |
| Pulse value of the flow meter                                   | 0.001...9999.999 liters or m <sup>3</sup>   |
| Pulse values and units for auxiliary inputs and contact outputs | Volume: 0.001...9999.999 ml, l, m <sup>3</sup> , GAL<br>Energy: 0.001...9999.999 Wh, kWh, MWh, MJ, GJ, KBTU, MBTU<br>Mass: 0.001...9999.999 T, Kg<br>Unitless mode possible: 0.001...9999.999   |
| Error limits  | Better than those required for calculators in accordance with EN 1434-1. Suitable for combined class 2 heat meters in accordance with EN 1434-1 when used with suitable volume metering units   |
| NFC interface   | For commissioning / parametrization: 13.56 MHz  |
| Bluetooth interface   | For commissioning / parametrization: 2.4 GHz  |
| Display   |   |
| Display type  | Backlit multi-function LCD display with 8 digits for meter reading. Symbols and short texts for user operation purposes.  |
| Display size  | 15 mm x 68 mm   |
| Display resolution and units volume                             | 1 – 0.001 m <sup>3</sup> , US Gal   |
| Display resolution and units energy                             | 1 – 0.001 kWh, MWh, MJ, GJ, KBTU, MBTU  |
| Display resolution and units mass                               | 1 – 0.001 T   |
| Error display   | Visible fault state indicator in display. Display blinks red in case of an error.   |
| Additional functions  |   |
| Data logger   | 500 values from all readings with a time stamp, stored in ring memory, logger interval, 1 minute, 1 hour, 1 day, 1 week, 1 month  |
| Billing data values   | 12 freely programmable billing dates to memorize indexes (e.g. monthly) for defined dates. Indexes can be consulted any time.   |
| Flow rate configuration   | Specific configuration for flow rate measurement purposes only. It can be 1 channel, 2 channels or 2-channel pulse collector to calculate the total sum. Temperature measurement is disabled; no temperatures are detected or displayed.                            |
| Glycol-based medium   | The “Glycol-based heat transfer medium” (GLY) option offers an excellent solution for solar-power thermal systems.  |
| On-site settings  | One-time on-site setting for calibration-relevant input values “IMP EBS”  |
| Simultaneous readout  | The specific “freeze” command makes it possible to store the desired values, which can then be read out one by one from the system.   |
| Bi-directional energy metering BDE                              | The BDE option allows emitted energy to be measured even in twin-conduit networks that perform a combined heating and cooling function. The measurement readings for heating and cooling are recorded separately for their corresponding cost calculation purposes. |

| Additional functions  |   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
|---|---|---|------------|---|---|---------------------------|--|---|---|---------------------------|--|--|----------------|-------|----------------|--------|----------------|--------|----------------|-------|--------------|-------|-----------------|--------------------------------|---------------------------------------|--------------------------------------|-----------------------------|--------|
| Combined heat- / cold meters BDV                                | The BDV option allows the measuring of energy exchange (draw/supply) for interlinked networks and charging / discharging in heat accumulators. The measurement of positive and negative are recorded separately for their corresponding energy consumption.   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Heat- / cold meters with two parallel flow sensors TWIN-V       | The Twin-V option is suitable for summer / winter metering where heating and cooling meters have two parallel flow sensors.   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Heat- / cold meters DTF   | The DTF option allows the measuring of energy heating or cooling meter with external tariff control for two tariff registers.   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Heat- / cold meters Twin-E                                      | The Twin-E option allows a measurement of parallel consumers composed of one closed circulation and one open circulation with reference temperature.  |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Heat- / cold meters TGR   | The TGR option allows a measurement with bonus / malus tariff management including reference temperature control.   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Heat- / cold meters eight tariffs                               | This option allows the management of up to eight different tariffs with reference temperature control. The measurement is split into different registers.   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Data backup in the event of a power failure                     | In EERPOM >10 years   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Adjustable low temperature difference $\Delta T$ cut-off (LFCO) | Function for stopping the energy calculation when the temperature difference is too low, $\Delta T$ LFCO adjustable $\Delta T = 0-2.99$ K.  |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Limit value monitoring  | One-sided or two-sided, hysteresis 0 – 10 %, action of the output signal is selectable.   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Mains version   |   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Power supply (Standard version)                                 | 1 W / 24 VAC/DC – 240 VAC, 50/60 Hz (according to EN 1434).   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Power supply (Smart version)                                    | 5W / 110 – 240 VAC, 50/60 Hz (according to EN 1434)   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Calculation cycle   | 1 s   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Backup battery real-time clock                                  | 3 V Li-Mn CR1220  |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Low voltage power supply for flow meters                        |   |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
|   | <table border="1"> <thead> <tr> <th>Voltage</th> <th>Flow meter</th> </tr> </thead> <tbody> <tr> <td>Supply voltage (Standard &amp; Smart version)</td> <td>2x 3.6 VDC, max. 2 mA<br/>galvanic isolation max. 48 VDC</td> <td>e.g. AMFLO® SONIC UFA 113</td> </tr> <tr> <td>Supply voltage (only on Smart version)</td> <td>1x 24 VDC, max.150 mA<br/>galvanic isolation max.48 V DC</td> <td>e.g. AMFLO® MAG Smart or active sensors</td> </tr> <tr> <td rowspan="8">3.6 V sensor power output</td> <td colspan="2">Power supply, galvanically isolated to the system, for external flow meters.</td> </tr> <tr> <td><math>V_{out\ nom}</math></td> <td>3.6 V</td> </tr> <tr> <td><math>V_{OUT\ min}</math></td> <td>3.45 V</td> </tr> <tr> <td><math>V_{OUT\ max}</math></td> <td>3.75 V</td> </tr> <tr> <td><math>I_{out\ max}</math></td> <td>10 mA</td> </tr> <tr> <td><math>V_{Ripple}</math></td> <td>50 mV</td> </tr> <tr> <td>Load regulation</td> <td><math>\pm 1</math> % @ load steps of 5 mA</td> </tr> <tr> <td>Insulation voltage galvanic isolation</td> <td>Normative 48 V<br/>technical: 312 VAC</td> </tr> <tr> <td>Clearance to other circuits</td> <td>0.5 mm</td> </tr> </tbody> </table> | Voltage                                 | Flow meter | Supply voltage (Standard & Smart version) | 2x 3.6 VDC, max. 2 mA<br>galvanic isolation max. 48 VDC | e.g. AMFLO® SONIC UFA 113 | Supply voltage (only on Smart version) | 1x 24 VDC, max.150 mA<br>galvanic isolation max.48 V DC | e.g. AMFLO® MAG Smart or active sensors | 3.6 V sensor power output | Power supply, galvanically isolated to the system, for external flow meters. |  | $V_{out\ nom}$ | 3.6 V | $V_{OUT\ min}$ | 3.45 V | $V_{OUT\ max}$ | 3.75 V | $I_{out\ max}$ | 10 mA | $V_{Ripple}$ | 50 mV | Load regulation | $\pm 1$ % @ load steps of 5 mA | Insulation voltage galvanic isolation | Normative 48 V<br>technical: 312 VAC | Clearance to other circuits | 0.5 mm |
| Voltage   | Flow meter  |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Supply voltage (Standard & Smart version)                       | 2x 3.6 VDC, max. 2 mA<br>galvanic isolation max. 48 VDC   | e.g. AMFLO® SONIC UFA 113               |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Supply voltage (only on Smart version)                          | 1x 24 VDC, max.150 mA<br>galvanic isolation max.48 V DC   | e.g. AMFLO® MAG Smart or active sensors |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| 3.6 V sensor power output                                       | Power supply, galvanically isolated to the system, for external flow meters.  |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
|   | $V_{out\ nom}$  | 3.6 V                                   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
|   | $V_{OUT\ min}$  | 3.45 V                                  |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
|   | $V_{OUT\ max}$  | 3.75 V                                  |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
|   | $I_{out\ max}$  | 10 mA                                   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
|   | $V_{Ripple}$  | 50 mV                                   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
|   | Load regulation   | $\pm 1$ % @ load steps of 5 mA          |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
|   | Insulation voltage galvanic isolation   | Normative 48 V<br>technical: 312 VAC    |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |
| Clearance to other circuits                                     | 0.5 mm  |   |            |   |   |                           |  |   |   |                           |  |  |                |       |                |        |                |        |                |       |              |       |                 |                                |                                       |                                      |                             |        |

| Low voltage power supply for flow meters |  |                                      |
|--|--|--------------------------------------|
| 24 V sensor power output                 | Power supply, galvanically isolated to the system, for external loads or flow meters.  |                                      |
|  | $V_{out\ nom}$   | 24 V                                 |
|  | $V_{OUT\ min}$   | 22 V                                 |
|  | $V_{OUT\ max}$   | 26 V                                 |
|  | $I_{Out\ max}$   | 180 mA                               |
|  | $V_{Ripple}$   | 200 mV                               |
|  | Load regulation  | ±6 % @ load steps of 100 mA          |
|  | Insulation voltage galvanic isolation  | Normative 48 V<br>Technical: 312 VAC |
| Clearance to other circuits              | 0.5 mm   |                                      |
| Pulse inputs                             |  |                                      |
| Input #1 (10/11)<br>Input #2 (54/55)     | Connecting a pulse generator according to NAMUR, with potential-free contact (reed relay) or SSR (solid state relay), or for active sensors with the following values. |                                      |
| Pulse input class ID                     | 2-wire pulse input according to class ID compliant with EN1434-2 Suitable for NAMUR-, "Open Collector" or mechanical pulse sources                                     |                                      |
|  | Supply voltage   | 8..8.4 V                             |
|  | Source impedance   | 1 kΩ                                 |
|  | Switching threshold IL   | 2.1 mA                               |
|  | Switching threshold IH   | 1.2 mA                               |
|  | Pulse length   | ≥ 2 ms                               |
|  | Pulse pause  | ≥ 2.5 ms                             |
|  | Max. pulse frequency   | ≤ 200 Hz                             |
| Typical input capacitance                | 20 nF  |                                      |
| Pulse outputs                            |  |                                      |
| Output #1 (50/51)                        | Passive digital output   |                                      |
| Pulse output                             | Contact rating   | 48 VDC, 100 mA                       |
|  | Electrical isolation   | 48 V                                 |
|  | Contact resistance (on)  | <30 Ω                                |
|  | Contact resistance (off)   | >10 MΩ                               |
|  | Pulse frequency  | Max. 10 Hz                           |
|  | Pulse width  | 50 ms                                |
| M-Bus (on-board or option)               |  |                                      |
| M-Bus interface                          | According to EN 13757-2/-3   |                                      |
| Addresses                                | Primary address: 0<br>Standard secondary address: 99999999   |                                      |
| Baud rate                                | 300, 2'400, 9'600 Baud   |                                      |
| wM-Bus (on-board or option)              |  |                                      |
| wM-Bus interface                         | According to EN 13757-4 / OMS 4.0  |                                      |
| Frequency band                           | 868 MHz (T1 Mode 5 and mode 7) - 25 mW (14 dBm)  |                                      |
| Addresses                                | OMS address including serial number of the device  |                                      |
| Modbus RTU (option)                      |  |                                      |
| Physical layer and address               | RS 485 / address: 1  |                                      |
| Baud rate                                | 300, 2'400, 9'600, 19'200, 38'400 Baud   |                                      |
| Address range (slave)                    | 1..247   |                                      |
| Parity                                   | Even   |                                      |

| <b>Modbus RTU (option)</b>         |  |
|------------------------------------|--|
| Function code                      | 03: Read holding register  |
| <b>LON interface (option)</b>      |  |
| Type                               | LON TP-FT 10<br>Free topology (2-wire twisted pair)<br>Certified in accordance with LONMARK® 3.4 |
| Baud rate                          | 78 k Baud  |
| Max. bus length                    | 500 m / 2700 m with/without termination resistors<br>64 nodes per segment                        |
| <b>BACnet MS/TP (option)</b>       |  |
| Physical layer and AMT ID          | RS 485 / ID: 431   |
| BACnet device profile and instance | B - ASC / the last 5 digits of the serial number   |
| BACnet MAC address                 | The last 2 digits of the serial number   |
| Baud rate and mode                 | Automatic / master   |
| <b>N2Open (option)</b>             |  |
| Physical layer and address         | RS 485 / address: 1..255 / Default: 1  |
| Baud rate                          | 9'600 Baud   |
| <b>2 analog outputs (option)</b>   |  |
| Output signal                      | 4...20 mA or 0...20 mA   |
| Supply voltage                     | 6...24 VDC   |
| Electrical isolation               | max. 48 VDC  |
| Maximum resistance                 | ≤ 837 Ω at 24 VDC, 0 Ω at 6 V  |
| Maximum transformer error          | 0.15 % of measured value + 0.15 % of end value   |
| <b>KNX (option)</b>                |  |
| Type                               | TP1 (2-wire twisted pair), certified according to KNX standard 2.1                               |
| Max. power consumption             | 10 mA  |
| Baud rate                          | 9'600 Baud   |
| <b>LoRa Wireless (option)</b>      |  |
| Communication interface            | LoRaWAN  |
| Frequency band                     | 868 MHz (T1 mode) - 16 mW  |
| Addresses                          | LoRa address   |
| Max. power consumption             | 50 mA  |
| Impedance of antenna               | 50 Ω   |
| Reinforcement                      | 0 db   |
| Antenna connection                 | Connector SMA  |
| <b>Smart Phone Commissioning</b>   |  |
| Operating system                   | Android >6.0; available on Play Store  |
| App                                | ParamApp   |
| Features                           | Commissioning and readout via NFC and Bluetooth interface for better usability                   |