TRIAD 2 Range

Programmable digital transducers with 1 to 4 analogue outputs
Programmable accuracy class

- Multi-function, economical instrument with 4 functions in the same casing
- Communication, Ethernet RS 485 or optical head
- Accessibility and safety: large-dimension terminals
- Ergonomic: easy mounting on DIN rail or switchboard

PRODUCT ADVANTAGES

+ Up to 4 PROGRAMMABLE ANALOGUE OUTPUTS
+ 4 kV INSULATION
+ CONFIGURABLE AND MODIFIABLE using the TRIADJUST 2 software
+ ADJUSTABLE accuracy within Class 0.1 as per IEC 60688
+ ADJUSTABLE RESPONSE TIME down to 50 ms
+ DIGITAL OUTPUT available as an OPTION

Main specifications

- Quantities measured: 1, 2, 3, 4 to be chosen from I, V, U, F, P, Q, S, cosφ, θ, q, q', U, q, V, tanφ
- Configuration of TRIAD 2: in factory or by the user with the TRIADJUST 2 software
- Accuracy (programmable): Class 0.1 / 0.15 / 0.2 / 0.5 / 1
- Current inputs: 1 A and 5 A
- Voltage inputs: 100 to 480 V (ph-ph) or 100 / √3 to 480 / √3 V (ph-N)
- Transfer curves: linear, 2 slopes or quadratic
- Output signals: ± 1 mA, ± 5 mA, ± 20 mA, ± 1 V, ± 10 V
- Response time in Class 0.2: 200 ms
- Operating frequency: 50 or 60 Hz
- Auxiliary power supply with wide dynamic range: 80 to 265 V ac/dc or 19 to 58 V dc
- Compliance with CE directive
- Digital technology

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TRIAD 2
Programmable model

➤ Factory-programmable

The transducer delivered is ready to operate and can be connected to the electrical network in order to deliver output signals tailored for your installation.

To benefit from this, you simply need to know the exact specifications of your electrical installation:
- Type of network: single-phase, balanced or unbalanced three-phase, 3 or 4 wires.
- Type of electrical connections.
- Number of electrical quantities to be measured: 1, 2, 3 or 4.
- Precise measurement ranges of the input/output quantities to be measured.

Users can modify a factory configuration at any time with the TRIADJUST 2 software if the specifications of the electrical network change.

➤ Environment and standards

**EMC IMMUNITY**

(standard of reference: IEC 60688, IEC 61326-1, IEC 61000-6-5)

| Shock voltage | as per IEC 61000-4-5 | 2 kV in differential mode | 4 kV in common mode |
| Oscillating wave | as per IEC 61000-4-12 | 1 kV in differential mode | 2.5 kV in common mode |
| Fast electrical transients in bursts | as per IEC 61000-4-4 | 2 kV on power supply | 2 kV on inputs/outputs |
| Electrostatic discharge | as per IEC 61000-4-2 | 8 kV in the air | 6 kV in contact |
| EM radiated field | as per IEC 61000-4-3 | 10 V/m (80 MHz to 3 GHz) |
| Voltage dips | as per IEC 61000-4-11 | 30% reduction during 20 ms | 60% reduction during 1 s |
| Voltage interruptions | as per IEC 61000-4-11 | 100% reduction during 100 ms | 100% reduction during 100 ms |

**EMC emissions**

Radiated and conducted As per CISPR11

**Climatic specifications (IEC 60068)**

2-1/2-2/2-30

- Operating temperature: -10°C to +55°C
- Storage temperature: -40°C to +70°C
- Relative humidity: ≤ 95% to 55°C

**Safety specifications (IEC 61010-1)**

- Installation category: 3
- Pollution level: 2
- Fire resistance: UL94, severity V0

**Mechanical specifications (IEC 60068)**

2-6/2-27/2-63/2-69/2-32/2-69/2-32

- Protection rating: IP 20
- Mechanical shocks: IEC 60660-2-27
- Vibrations: IEC 60660-2-6
- Drop test with packaging: NF 0042-1

➤ Mounting accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate mounting for T1xy</td>
<td>ACCT 1007</td>
</tr>
<tr>
<td>Plate mounting for T3xy</td>
<td>ACCT 1006</td>
</tr>
</tbody>
</table>

➤ Casing

<table>
<thead>
<tr>
<th>Weight</th>
<th>320g (T1xy) / 700g (T3xy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting</td>
<td>DIN rail 43700 or plate mounting</td>
</tr>
<tr>
<td>Connection</td>
<td>Terminals with mobile stirrup clamp with screw for 4 single-wire 6 mm² conductors or 2 multi-wire 4 mm² conductors</td>
</tr>
</tbody>
</table>

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## TRIAD 2 Range

### Hardware identification

The TRIAD 2 T1xy and T3xy are fully configurable with the TRIADJUST 2 software which allows users to modify the characteristics of their products right up to the last minute.

![Model Diagram]

**Number of analogue outputs**
- 0 = none
- 1 = 1 output

**Communication module**
- 0 = optical head
- 1 = optical head + RS485
- 2 = optical head + Ethernet

**Example:** T314 = Large-model TRIAD 2 with optical head and RS485 + 4 analogue outputs

<table>
<thead>
<tr>
<th>Network</th>
<th>Function</th>
<th>T1xy model</th>
<th>T3xy model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-phase</td>
<td>Y</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Q</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Tactive</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Treact</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>P1, P2, P3, P4</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Q1, Q2, Q3, Q4</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>S1, S2, S3, S4</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Tactive</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Treact</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Cos(q1, q2, q3, q4)</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

| Balanced 3-phase, 3 wires | | |
|---------------------------|-----------------|
| | V1, V2, V3 | • | • |
| | U12, U23, U31 | • | • |
| | I1, I2, I3 | • | • |
| | P1, P2, P3, P4 | • | • |
| | Q1, Q2, Q3, Q4 | • | • |
| | S1, S2, S3, S4 | • | • |
| | Tactive | • | • |
| | Treact | • | • |
| | Cos(q1, q2, q3, q4) | • | • |

| Balanced 3-phase, 4 wires | | |
|---------------------------|-----------------|
| | V1, V2, V3 | • | • |
| | U12, U23, U31 | • | • |
| | I1, I2, I3 | • | • |
| | P1, P2, P3, P4 | • | • |
| | Q1, Q2, Q3, Q4 | • | • |
| | S1, S2, S3, S4 | • | • |
| | Tactive | • | • |
| | Treact | • | • |
| | Cos(q1, q2, q3, q4) | • | • |

| Unbalanced 3-phase, 3/4 wires | | |
|-----------------------------|-----------------|
| | V1, V2, V3 | • | • |
| | U12, U23, U31 | • | • |
| | I1, I2, I3 | • | • |
| | P1, P2, P3, P4 | • | • |
| | Q1, Q2, Q3, Q4 | • | • |
| | S1, S2, S3, S4 | • | • |
| | Tactive | • | • |
| | Treact | • | • |
| | Cos(q1, q2, q3, q4) | • | • |
| | Cos(U12/U23, U23/U31, U31/U12) | • | • |
| | q1 (V1/V2, V2/V3, V3/V1) | • | • |
TRIAD 2
Programmable model

Electrical specifications

<table>
<thead>
<tr>
<th>Voltage input</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated value</td>
<td>T1: from 57.7 Vac to 276 Vac max. T3: from 57.7 Vac to 480 Vac max.</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz: 42.5...57.5 Hz 60 Hz: 51...69 Hz</td>
</tr>
<tr>
<td>Max. measured voltage on primary</td>
<td>650 kV (ph-ph)</td>
</tr>
<tr>
<td>Acceptable overloads</td>
<td>T1: 300 Vac permanent - 460 Vac / 10s T3: 520 Vac permanent - 800 Vac / 10s</td>
</tr>
<tr>
<td>Consumption</td>
<td>&lt; 0.2 A</td>
</tr>
<tr>
<td>Input impedance</td>
<td>400 kΩ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current inputs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated value</td>
<td>0 to 10 A max.</td>
</tr>
<tr>
<td>Max. measured current on primary</td>
<td>25,000 A</td>
</tr>
<tr>
<td>Acceptable overload</td>
<td>50 In / 1 s</td>
</tr>
<tr>
<td>Consumption</td>
<td>&lt; 0.15 VA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Auxiliary power supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High level</td>
<td>80 / 265 Vac (50/60 Hz) — 80 / 265 Vdc</td>
</tr>
<tr>
<td>Low level</td>
<td>19 / 58 Vdc</td>
</tr>
<tr>
<td>Consumption</td>
<td>T1: 0.5 VA max. T3: 20 VA max.</td>
</tr>
<tr>
<td></td>
<td>T1: 5 W max. T3: 10 W max.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analogue outputs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated values</td>
<td>Current Voltage</td>
</tr>
<tr>
<td></td>
<td>± 1mA, ± 5mA, ± 20mA ± 1 V, ± 10 V</td>
</tr>
<tr>
<td>Acceptable resistive load</td>
<td>15 V / In (1) ≥ 1 kΩ</td>
</tr>
<tr>
<td>Acceptable capacitive load</td>
<td>0.1 µF 0.1 µF</td>
</tr>
<tr>
<td>Overrun</td>
<td>1.2 Io (1) 1.2 Uo (1)</td>
</tr>
<tr>
<td>Peak-peak residual wave</td>
<td>± 0.2% of Io (1) ± 0.2% of Uo (1)</td>
</tr>
<tr>
<td>Programmable response time</td>
<td>50 ms — 100 ms — 200 ms — 500 ms — 1 s</td>
</tr>
<tr>
<td>Transfer curve</td>
<td>Linear, 2 slopes or quadratic</td>
</tr>
</tbody>
</table>

Communication

<table>
<thead>
<tr>
<th>Optical head</th>
<th>Ethernet</th>
<th>RS485</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection</td>
<td>USB (PC) Optical (product)</td>
<td>RJ45</td>
</tr>
<tr>
<td>Protocol</td>
<td>MODBUS RTU mode</td>
<td>MODBUS / TCP RTU mode</td>
</tr>
<tr>
<td>Speed</td>
<td>38,400 baud</td>
<td>10 base T</td>
</tr>
<tr>
<td>Parity</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bus addresses</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Transmission length</td>
<td>2 m</td>
<td>100 m</td>
</tr>
</tbody>
</table>

Metrological specifications

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Accuracy classes over measurement range (as per IEC 60688)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RT = 50 ms RT = 100 ms RT = 20 ms RT = 500 ms RT = 1s</td>
</tr>
<tr>
<td>V, U, I, F, P, Q, S, T, Tanq, Cosq, q1, q2, u1</td>
<td>± 1% ± 0.5% ± 0.2% ± 0.15% ± 0.1%</td>
</tr>
</tbody>
</table>

* RT: Response time for F = 50 Hz
** Phase angle between voltages

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TRIAD 2 Range

Electrical connections
Single-phase network

II, f:

V1, f:

Programmable digital transducers

Measurement and instrumentation
Programmable digital transducers

www.ceerelays.co.uk
Balanced 3-phase, 3-wire network

Phase rotation authorized
TRIAD 2 Range

Balanced 3-phase, 4-wire network

V1, V2, V3, U12, U23, U31 F:

TD217

TD218

TD219

TD220

TD221

TD222

Phase rotation authorized
Balanced 3-phase, 4-wire network (continued)

V1, V2, V3, U12, U23, U31, I1, I2, I3, P1, P2, P3, Pt, S1, S2, Sc, Q1, Q2, Q3, Qc, FF1, FF2, PP3, FF4, F, TANϕ1, Cosϕ1, Cosϕ2, Cosϕ3, Cosϕt, q1, q2, q3, q t:

Unbalanced 3-phase, 3-wire network


V1, V2, V3, U12, U23, U31, F,
Angle (V1/V2, V2/V3, V3/V1),
Angle (U12/U23, U23/U31, U31/U12):

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TRIAD 2 Range

Unbalanced 3-phase, 3-wire network (continued)

Measurement and instrumentation Programmable digital transducers

I1, I2, I3, F:

TD228

TD229

TD230

U12, U23, U31, I1, I2, I3, P1, P2, P3, P4, P5, S1, S2, S3, S4, Q1, Q2, Q3, Q4, FP1, FP2, FP3, FP4, F, TANϕ, Cosϕ1, Cosϕ2, Cosϕ3, ϕ1, ϕ2, ϕ3, Angle (U12/U23, U23/U31, U31/U12):

TD231

TD231D

TD232

TD232D

TD233

TD233D

V1, V2, V3, U12, U23, U31, I1, I2, I3, P1, P2, P3, P4, P5, S1, S2, S3, S4, Q1, Q2, Q3, Q4, FP1, FP2, FP3, FP4, F, TANϕ, Cosϕ1, Cosϕ2, Cosϕ3, Cosϕt, ϕ1, ϕ2, ϕ3, Angle (V1/V2, V2/V3, V3/V1), Angle (U12/U23, U23/U31, U31/U12):

TD231Y

TD232Y

TD233Y
Unbalanced 3-phase, 4-wire network


Dimensions (in mm)

Panel drilling diagram for plate mounting

Accessory for plate mounting with screw (option)

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TRIAD 2 Range

TRIAD 2 programmable via TRIADJUST 2

TO ORDER

- **T1 — SMALL MODEL** (60 x 81 x 120.5 mm)

<table>
<thead>
<tr>
<th>Link</th>
<th>Output</th>
<th>Supply</th>
<th>Without tropicalization</th>
<th>With tropicalization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>80-265 V AC/DC</td>
<td>01380001</td>
<td>01380002</td>
</tr>
<tr>
<td>Optical</td>
<td>± 20 mA</td>
<td>19-58 V DC</td>
<td>01380003</td>
<td>01380004</td>
</tr>
<tr>
<td></td>
<td>± 10 V</td>
<td>80-265 V AC/DC</td>
<td>01380005</td>
<td>01380006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19-58 V DC</td>
<td>01380007</td>
<td>01380008</td>
</tr>
</tbody>
</table>

- **T3 — LARGE MODEL** (120 x 81 x 120.5 mm)

<table>
<thead>
<tr>
<th>Link</th>
<th>Output</th>
<th>Supply</th>
<th>Without tropicalization</th>
<th>With tropicalization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>80-265 V AC/DC</td>
<td>01380101</td>
<td>01380108</td>
</tr>
<tr>
<td>Optical</td>
<td>± 20 mA</td>
<td>19-58 V DC</td>
<td>01380109</td>
<td>01380116</td>
</tr>
<tr>
<td></td>
<td>± 10 V</td>
<td>80-265 V AC/DC</td>
<td>01380117</td>
<td>01380124</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19-58 V DC</td>
<td>01380125</td>
<td>01380132</td>
</tr>
</tbody>
</table>

- **TRIAD 2 factory-programmable**

1 **Model**
- T1 : small model — 1 analogue output
- T3 : large model — 1 to 4 analogue output(s)

2 **Communication**
- 0 : Without
- 1 : RS485
- 2 : Ethernet

3 **Number of analogue outputs**
- 0 : Without (Choice of a minimum communication)
- 1 : 1 output
- 2 : 2 outputs (T3 model only)
- 3 : 3 outputs (T3 model only)
- 4 : 4 outputs (T3 model only)

4 **Frequency**
- 0 : 50 Hz
- 1 : 60 Hz

5 **Supply**
- 0 : 80-265 V AC/DC
- 1 : 19-58 V DC

6 **Tropicalization**
- 0 : Without
- 1 : With

7 **Analogue output calibres**
- 0 : -20 mA to +20 mA
- 1 : -5 mA to +5 mA
- 2 : -1 mA to +1 mA
- 3 : -10 V to +10 V
- 4 : -1 V to +1 V

8 **Network**
- 0 : Single-phase
- 1 : Balanced 3-phase, 3 wires
- 2 : Balanced 3-phase, 4 wires
- 3 : Unbalanced 3-phase, 3 wires
- 4 : Unbalanced 3-phase, 4 wires

9 **Connection configuration**

Indicate the diagram number. E.g. TD204

10 **Voltage input**

Indicate direct voltage to be measured or the VT ratio

11 **Current input**

Indicate direct current to be measured or the CT ratio

12 **Analogue output**

Indicate for each output:
- a : Quantity to be measured
- b : Transfer curve
- c : Input signal: Min — Breaking point - Max
- d : Input unity
- e : Output signal: Min — Breaking point - Max

To simplify the procedure when ordering you can send us the form on page xxx.
Factory-programmed TRIAD 2: order form

1 - Model / Hz
- T1 or T3
- 50 Hz or 60 Hz

2 - Network
- Single-phase
- 3-phase balanced three-phase
- 3-phase balanced three-phase
- 4-wire unbalanced three-phase
- 4-wire unbalanced three-phase

3 - Options / Connection
- Ethernet or AS485
- Tropicalization
- Connection diagram: TD

4 - Power supply
- 80 to 265 Vac (50/60 Hz) / 80 to 265 Vdc or 19 to 58 Vdc

5 - Inputs
- Current
  - With current transformer or Direct
  - Primary: A
  - Secondary: A
- Voltage
  - With voltage transformer or Direct
  - Primary: V
  - Secondary: V

Available quantities
- P1, P2, P3, P1, P2, P3, P1, P2, P3, P1, P2, P3, P1, P2, P3
- Q1, Q2, Q3, Q1, Q2, Q3, Q1, Q2, Q3, Q1, Q2, Q3
- S1, S2, S3, S1, S2, S3, S1, S2, S3, S1, S2, S3

Output 1
- Quantity and measurement range (x)
  - Min: 
  - Max: 
  - Unit:
- Transfer curve
  - Linear
  - 2 slopes
  - Quadratic
- Output signal (y)
  - Min: 
  - Breaking point: 
  - Max: 
  - Unit:
- Accuracy class
  - 50 Hz / 60 Hz

Output 2
- Quantity and measurement range (x)
  - Min: 
  - Max: 
  - Unit:
- Transfer curve
  - Linear
  - 2 slopes
  - Quadratic
- Output signal (y)
  - Min: 
  - Breaking point: 
  - Max: 
  - Unit:
- Accuracy class
  - 50 Hz / 60 Hz

Output 3
- Quantity and measurement range (x)
  - Min: 
  - Max: 
  - Unit:
- Transfer curve
  - Linear
  - 2 slopes
  - Quadratic
- Output signal (y)
  - Min: 
  - Breaking point: 
  - Max: 
  - Unit:
- Accuracy class
  - 50 Hz / 60 Hz

Output 4
- Quantity and measurement range (x)
  - Min: 
  - Max: 
  - Unit:
- Transfer curve
  - Linear
  - 2 slopes
  - Quadratic
- Output signal (y)
  - Min: 
  - Breaking point: 
  - Max: 
  - Unit:
- Accuracy class
  - 50 Hz / 60 Hz

Please indicate the unit of the measurement range, e.g. kW, V, or MW

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TRIADJUST 2 software

Designed for quick configuration and display of all the parameters of your TRIAD 2 transducers

Description

The TRIADJUST 2 software allows quick, unlimited programming of all your TRIAD 2’s parameters.

Using a PC and the optical lead supplied in each kit, connect your product’s auxiliary power supply to dialogue with total security. Depending on your TRIAD 2’s configuration, remote communication is possible via RS485 or Ethernet.

In the Windows™ environment, initialize or simply modify the quantities measured, the measurement ranges and the analogue outputs on the transducers installed. TRIADJUST 2 also offers other functions such as Diagnosis of your network, instantaneous Display of the electrical quantities and Real-time Recording of the measurements in an exported file.

You can also print labels indicating the configurations and connections of your products.

Minimum configuration

- Platform: PC
- Operating system: Windows 2000 or XP
- Processor: Pentium-compatible
- RAM: 128 MB
- Hard disk: 40 GB
- Drive: CD-ROM
- Communication port:
  - Local: USB 1.1 minimum
  - Remote: RS485 and/or Ethernet
The TRIADJUST 2 configuration kit comprises:
- The TRIADJUST 2 software
- An optical / USB lead
- 30 sheets of blank labels
- A 230 x 185 x 45 mm carrying case

Labels common to both kits
A sheet contains two labels, one for the configuration of the inputs/outputs and the other for the programmed connection diagram. The labels can be printed on all types of laser printers.

### TO ORDER

<table>
<thead>
<tr>
<th>Model</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRIADJUST 2 kit</td>
<td>P01380410</td>
</tr>
<tr>
<td>TRIADJUST 2 “PREMIER” workstation</td>
<td>P01380420</td>
</tr>
</tbody>
</table>

### Accessories
- Set of 30 sheets of blank labels: P01380400
- Optical/USB lead: P01330403

Associated product
TRIAD 2 programmable with TRIADJUST 2

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